THE EFFECTS OF PRODUCT POPULARITY ON CONSUMER DECISIONS

BY

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DISSERTATION

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ABSTRACT

Previous research suggests that consumers tend to use indications of products' popularity to a greater extent when high demands are placed on their cognitive resources such as when decision uncertainty is high and the amount of information presented is large. In this case, products' popularity is likely to override the effect of specific attribute descriptions. In some cases, however, indications of others' product preferences can sensitize consumers to a discrepancy between their general knowledge about a product category and their knowledge about the specific products they are evaluating. In my thesis, I identified conditions in which this is the case.

I propose that product popularity makes knowledgeable consumers aware of a "knowledge gap," which increases their curiosity about the uncertain product assortment. Consequently, they think about the products' attributes in an attempt to understand others' reactions to the assortment. As a result, the attribute information can have *greater* influence on their judgments than it would have if popularity information were not presented. Three studies provide evidence to corroborate this expectation. Furthermore, the results show that consumers' tendency to deliberate on product attribution is stronger when (a) consumers perceive their general product knowledge to be high and (b) making decisions is cognitively demanding.

To my parents, Daehyeong, Sophia, and Matthew

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CHAPTER 1 INTRODUCTION

Information about a product's popularity is based on a consensus among previous consumers, indicating which option is most desirable among those available. Popularity can be inferred from the frequency of purchases (e.g., Cai, Chen, & Fang, 2009), the number of downloads (e.g., Salganik, Dodds, & Watts, 2006; Salganik & Watts, 2008) or the number of clicks on specific options on a website (e.g., Tucker & Zhang, 2011).

This type of information is a major component of many promotions and advertisements, from *The New York Times*' best-seller list to weekly box office rankings for movies to the list of top songs in the iTunes store. Furthermore, its usage extends beyond commercial goods or services to digital content. For example, *The New York Times* and Yahoo list the most-viewed articles and their top 10 user searches on their webpages, informing visitors what others liked.

This frequent use of popularity information may reflect the common belief that this information has a positive impact on consumer decisions. Research in many areas, ranging from economics to psychology to marketing (Cai et al., 2009; Goldstein, Cialdini, & Griskevicius, 2008; Mackie, 1987; Salganik et al., 2006; Salganik & Watts, 2008; Tucker & Zhang, 2011), has consistently confirmed that the presence of product popularity information tends to make consumers lean toward more popular options. For example, adding popularity information among options leads to greater sales (Cai et al., 2009), directs prosocial behaviors (Goldstein et al., 2008), and leads to an increased number of downloads of an initially less preferred product (Salganik et al., 2006; Salganik & Watts, 2008) than does excluding this information.

The impact of product popularity on consumer decisions tends to be contingent on situational and individual factors. In particular, the influence of product popularity information often depends on decision uncertainty and consumers' product knowledge. In general, the effect of others' opinions is likely to increase with factors related to decision uncertainty (Gino & Moore, 2007; Sasaki, Becker, Janssen, & Neel, 2011). For example, when other goal-relevant information is either unavailable or difficult to process, a product's popularity increases its impact on decisions as a heuristic basis for judgment (Chaiken, 1980; Giner-Sorolla & Chaiken, 1997; Maheswaran & Chaiken, 1991; Shah & Oppenheimer, 2008).

However, even when decision uncertainty is high, the influence of popularity information appears to depend on consumers' product knowledge. On the one hand, consumers with limited product knowledge tend to place greater emphasis on others' opinions than attribute information (Brucks, 1985) and are more likely to adopt the majority's opinion on an issue rather than more issue-relevant material (Mackie, 1987; Sasaki et al., 2011). On the other hand, knowledgeable consumers are believed to know well about a specific product category in general and often to have well-defined preferences (Alba & Hutchinson, 1987; Mehta, Hoegg, & Chakravarti, 2011; Nam, Wang, & Lee, 2012; Ratneshwar & Chaiken, 1991; Wood, Kallgren, & Preisler, 1985). As a result, they are often more likely to ignore product popularity and might even dispute its implications (Fitzsimons & Lehmann, 2004; Goodman, Broniarczyk, Griffin, & McAlister, 2013; Yaniv, 2004).

These considerations therefore suggest that when uncertainty is high, consumers with limited product knowledge rely more on product popularity information as a mental shortcut to reduce their decision effort, whereas knowledgeable consumers do not. This conclusion assumes,

however, that consumers with high product category knowledge also know enough about the particular options in a product assortment to evaluate them easily.

In reality, however, consumers often feel uncertain about a particular product assortment even if they possess substantial knowledge about the product category in general. For example, a typical supermarket might contain 275 types of cereal and 285 varieties of cookies (Botti & Iyengar, 2006) because manufacturers such as Kellogg and Procter & Gamble keep updating the products they manufacture. Making the situation more complicated, retailers often introduce their own brands. As a result, although consumers may feel confident in their knowledge about a type of product category, they might still lack knowledge about a particular set of products of that type. Previous research has not fully examined the impact of product popularity on consumers' decision processes when this gap in their knowledge exists.

In this thesis, I investigate the nature of the impact of product popularity in this particular context. I propose that product popularity information often sensitizes knowledgeable consumers to a discrepancy between their general knowledge about a product category and their knowledge about the particular products in an assortment that others appear to know better. With three experiments, I find that consumers' awareness of this knowledge increases their epistemic curiosity and consequently their attention to attribute information that might explain others' preferences.

I review relevant research and theory in Chapter 2. Then, in Chapter 3, I propose a theoretical framework to explain a situation that occurs often but has been neglected in the existing research. Chapter 4 describes the studies that I have conducted to examine the effect of product popularity described earlier. The first study explores the influence of product popularity

on attribute deliberation. I find that when consumers choose an option from among unfamiliar ones, they engage in more deliberative processing in the presence than in the absence of popularity cues, leading to stronger purchase intention. Furthermore, this effect is more evident when the choice set size is large. In the next study, I obtained evidence that popularity cues have different effects on knowledgeable versus unknowledgeable participants' attention to product attribute information and that this attention is mediated by the effect of popularity cues on epistemic curiosity.

The last study provides direct evidence of the increased effect of popularity information on knowledgeable consumers' use of product attribute information. Specifically, I found that product popularity increases the impact of the attributes' favorableness on knowledgeable consumers' judgments by motivating them to deliberate on product attribute information.

CHAPTER 2 LITERATURE REVIEW

In this chapter, I discuss the existing literature on the effect of product popularity on consumer judgments. In addition, situational and individual factors that modify this impact are reviewed.

2.1 General Effects of Product Popularity

A rich body of research has emphasized that information about a product's popularity has a significant effect on consumer behaviors and evaluations (Cai et al., 2009; Carare, 2012; Goldstein et al., 2008; Hanson & Putler, 1996; Salganik et al., 2006; Salganik & Watts, 2008; Tucker & Zhang, 2011). This stream of research has consistently shown that consumers tend to go along with the majority (i.e., to choose more popular options). The result of this effect on consumer behaviors is discussed below and summarized in Appendix F.

Popularity information can reinforce a product's existing popularity by encouraging consumers to flock to greatly preferred options (Cai et al., 2009; Carare, 2012; Hanson & Putler, 1996; Huang & Chen, 2006). In a field experiment, for example, Cai et al. (2009) found that table cards naming the five most popular items in a restaurant boosted the number of orders of these items by as much as 20%. Similarly, Hung and Chen (2006) show that a greater sales volume leads to a higher preference for an option when other related information does not discriminate among the alternatives. In particular, participants chose between two travel books

that were similar in publisher and price but differed in terms of sales volume. In one condition, the sales volume of one book was four times greater than the other and in the other, it was only slightly greater. More participants chose the first book when the difference between the sales volumes of the two books was large than when it was small. Furthermore, people are willing to pay more for the more popular items. Carare (2012) show that consumers are willing to pay about $4.50 more for top-ranked mobile applications than for the same applications presented without ranking information.

The power of product popularity is evident even if the information is experimentally manipulated. Hanson and Putler (1996) showed that manipulating perceptions of the number of other users who had previously downloaded two target files influenced future sales levels. Although the two target options were essentially identical in their observed features (such as function, file size, level of informational detail, etc.), they found that the options that were ostensibly most popular were accessed 50% more often than control options.

Similarly, options that are initially less preferred by the majority can become mainstream if they look popular (Salganik et al., 2006; Salganik & Watts, 2008; Tucker & Zhang, 2011). In a field study by Salganik and Watts (2008), participants first listened to 48 previously unknown songs from unknown bands and then decided which of these songs to download. Later, a separate set of participants listened to and downloaded the same list of songs having received altered information about the number of downloads of each song by the first subject group. This information was opposite from the actual number of downloads; that is, the least popular song in the previous session was described most popular and the most popular song was described as least popular. After presenting this false popularity, the initially least popular song became the most popular (i.e., it was downloaded by the largest number of participants).

In some cases, behavior can be influenced to a greater extent by popularity information than by rational reasons for engaging in it. In a field experiment, Goldstein et al. (2008) presented two different messages urging hotel guests' participation in a towel reuse program. Each message contained the same information about the benefits of participating in the program (e.g., it would save the environment 72,000 gallons of water). However, one appeal began with "HELP SAVE THE ENVIRONMENT," whereas the other began with "JOIN YOUR FELLOW GUESTS IN HELPING TO SAVE THE ENVIRONMENT" and stated that 75% of the hotel's guests participated in the towel reuse program. The towel reuse rate was greater in the social (the latter) message than in the standard environmental message condition (44% vs. 35%, respectively).

Even though the standard message emphasized the importance of the towel reuse program and its impact on the environment, the social message led to greater participation in the program. In other words, information about the majority's choice had a greater effect on participants' behavior than did an appeal that conveyed the rational importance of these changes for the environment. (For other indications that people's behavior is affected more strongly by others' actions than by persuasive appeals that stress the benefits of the behavior, see Cialdini, 2012.)

In sum, these studies indicate that popularity information is powerful enough to direct consumers' evaluation and behavior: it can help to keep currently popular options popular in the future, regardless of the actual quality of those options. Also, it can boost behaviors that would not occur without knowledge of the high frequency of those behaviors in the past.

2.2 Theoretical Explanation

As reviewed in the earlier section, research in social psychology (Asch, 1956; Cialdini & Trost, 1998; Deutsch & Gerard, 1955) and economics (Banerjee, 1992; Bikhchandani, Hirshleifer, & Welch, 1992) provides countless evidence of conformity in individuals' judgments. In Asch's famous line judgment experiment (1956), for example, participants who were exposed to the majority's obviously incorrect judgment of line length echoed the majority's judgment. Similarly, with his mathematical model, Banerjee (1992) shows that after observing how other have behaved, decision makers tend to do what others have done rather than using the available information. In other words, people often conform to the majority's behavior and beliefs.

Why do people choose the options that are most popular? People are inclined to follow others' opinions for at least two reasons: individuals may adopt the observed choices of others in order to obtain others' approval or understand an unfamiliar situation and behave correctly. Cialdini and Goldstein (2004) indicate that these two motives are interrelated and often difficult to disentangle theoretically as well as empirically (David & Turner, 2001).[1]. However, one of these motives can drive individuals' action more strongly depending on which goal is more salient at the time of the decision. When a decision is susceptible to others' judgment, for example, individuals care more about socially desirable options.

[1] For a detailed discussion about the differences between two motives for social influence, see Cialdini, 2012.

2.2.1 Social desirability motives

Individuals may interpret the majority's opinion as an indication of the product's social desirability (i.e., what products most others consider appropriate) (Cialdini, Reno, & Kallgren, 1990; Venkatesan, 1966). This normative influence may be more closely related to social and cultural factors than informational influence.

Social factors. Research has shown that people tend to follow what other people normally do in a certain situation, especially when they notice a group norm. In an experiment by Venkatesan (1966), participants along with three confederates were asked to determine which of three dress suits seemed best. When the three confederates all chose the same option, the naïve participant chose this option as well. However, in a control condition where there were no confederates, participants' choice of dress suit did not vary significantly from by a chance. Hence, in the presence of group pressure, a particular suit preferred by the majority was more likely to be chosen, but in the absence of group pressure each suit was equally likely to be chosen as the best suit.

Similarly, Cialdini and colleagues (1990) show that people tend to increase norm-consistent behavior when the norm is salient to them. In their study, participants had the opportunity to litter either in a previously clean or a heavily littered environment. In the high salience of group norm condition, they saw a confederate drop trash in the environment. In the low salience of group norm condition, they saw a confederate who just passed by the situation. When the group norm favored littering, participants littered more in the littered environment than

in the clean environment. More importantly, this tendency was stronger when the group norm was salient than not (Cialdini et al., 1990).

Cultural factors. There are cultural differences in conformity (Aaker & Maheswaran, 1997; Aaker & Williams, 1998; Bond & Smith, 1996; Briley, Wyer, & Li, 2014; Choi, Nisbett, & Norenzayan, 1999; Han & Shavitt, 1994; Lin, 2001). A recent review of cultural influence indicates that because East Asians are disposed to think of themselves as part of a collective, they may be more likely to be influenced by the opinions of others than Westerners are (Briley et al., 2014). Hence, East Asians are more likely to respond to messages that emphasize group benefits rather than self-focused appeals (Aaker & Williams, 1998; Han & Shavitt, 1994; Lin, 2001).

For example, Bond and Smith (1996) show that residents of collectivist countries are more inclined to conform to others' opinions than are residents of individualistic countries. Similarly, Choi, Nisbett, and Norenzayan (1999) show that East Asians weigh consensus information more heavily than North Americans, who perceive consensus information as relatively nondiagnostic. This difference has been confirmed in a marketing context. Aaker and Maheswaran (1997), for example, indicated that Chinese participants were more likely to conform to other consumers' evaluations of a target product than Americans were.

In sum, when individuals make evaluations in a social context (e.g., they need to justify their decisions or their decisions are susceptible to others' reactions), they may want to follow the majority's behaviors. In this case, a social desirability motive may be the predominant influence on their decision.

2.2.2 Informational motives

In contrast, when a decision situation is not related to these social aspects, individuals' behaviors are more likely to be based on informational considerations. For example, when people make decisions regarding an online auction, how others expect them to behave is of little concern. Therefore, when they choose the most preferred option, they tend to have stronger informational than social desirability motives (Dholakia, Basuroy, & Soltysinski, 2002).

Evidence that product popularity can serve as an informational motive by providing indications of a product's quality was discussed by Mackie (1987), who suggests that a group's opinion may be inferred to reflect objective reality. Research on audience responses also shows that people tend to apply a simple consensus heuristic: if other people think the message is correct, it is probably valid (Axsom, Yates, & Chaiken, 1987). Similarly, people learn the fundamental value of an object (e.g., quality of products) by observing others' behavior (e.g., purchase decisions). This may be because they tend to believe that others' decisions are based on decision-relevant information that they do not personally possess (Banerjee, 1992; Bonabeau, 2004). Therefore, decision makers follow others' choices because they infer a product's quality from whether others have chosen it (Banerjee, 1992; Bikhchandani et al., 1992).

These inferences can outweigh their own information about the products, increasing individuals' conformity to their predecessors' actions (Bikhchandani et al., 1992). Hence, product popularity can have a considerable influence on consumers' judgments when they wish to make an objectively good decision (Cialdini, 2009; Cialdini & Goldstein, 2004).

2.2.3 Other possible mechanisms

However, other possible factors can also determine the influence of popularity information. For example, popularity information can make popular options more noticeable than alternatives. Thus, when consumers are not fully informed about the set of choices available, they might sometimes choose one of the more popular choices simply because these choices are more salient. However, the effect of salience is not as strong as other effects I have reviewed. In the aforementioned study by Cai et al. (2009), table cards naming the five most popular items in a restaurant boosted the frequency with which these items were ordered by as much as 20%. However, cards that highlighted the same five items without providing an indication of their popularity had little effect on sales. In other words, even when the salience of the five items is similar in two conditions, indications of item popularity have a stronger effect on future patrons' decisions than merely highlighting the names of the alternatives.

2.2.4 Summary

The studies reviewed in this section provide convergent evidence that popularity information leads people to follow what others have chosen because they interpret product popularity as either an indication of the product's social desirability or product quality. The latter influence predominates when a decision situation is not related to social aspects such as making choices in a public setting or fulfilling a goal of belonging to a desired group.

Regardless of individuals' motives, the impact of product popularity on consumer decisions is particularly strong when uncertainty is high. That is, people are more likely to rely

on others' choices when other goal-relevant information is either unavailable or difficult to process. In the following section, I will discuss research bearing on consumers' decision processes in this case and then situational and individual factors that have influence on the impact of product popularity in these processes.

2.3 Impact of Product Popularity in Information Processing

Generally, when other goal-relevant information is either unavailable or difficult to process, individuals tend to search for a less effortful, heuristic basis for decisions (Fiske & Taylor, 1984; Johnson, Payne, & Bettman, 1988; Wood, 2000). This is suggested by the dual-process model including the elaboration likelihood model (Petty & Cacioppo, 1981; Petty & Cacioppo, 1986) and heuristic-systematic model (Chaiken, 1980). In the following section, I will summarize the general implications of the dual-process models and then discuss factors that influence the effect of product popularity.

2.3.1 Dual process model: The elaboration likelihood and heuristic-systematic models

A rich body of research has shown that individuals process information either systematically via a central path or heuristically via a peripheral path. The former is a comprehensive and analytic tendency to scrutinize a great deal of information whereas the latter is a limited mode of information processing that is easier to implement but frequently results in

less accurate decisions, biased responses, and preference reversals (Johnson et al., 1988; Russo, 1977).

Research on the dual-process model consistently suggests that individuals' processing style depends on their ability and motivation to process information. This model predicts that when ability or motivation to comprehend issue-relevant information is sufficient, systematic processing through the central route is likely to happen. Hence, the content of a message tends to have a significant influence on judgment. However, when ability or motivation is low, a simple decision rule (e.g., brand name or expertise of the information source) has a sizable impact on judgment.

A series of studies reveal various factors that change ability and motivation. Factors having influence on motivation include need for cognition(Petty, Briñol, Loersch, & McCaslin, 2009), personal relevance (Hazlewood & Chaiken, 1990), task importance (Maheswaran & Chaiken, 1991), accountability for one's attitude judgments (Chaiken, 1980; Tetlock, 1983), congruency between recipients' self-monitoring tendency and the message source (DeBono & Harnish, 1988) and exposure to unexpected message content (Maheswaran & Chaiken, 1991)**.** For example, Hazlewood and Chaiken (1990) show that when tasks are not relevant to participants they are more likely to lose their motivation to deliberate. Hence, they tend to follow the majority's opinion. Debono and Harnish (1988) demonstrated that high-self monitoring individuals were systematically processing the attractive source's message whereas low self-monitoring individuals were systematically processing the expert source's message. They suggested that this is because the high and low-self monitoring individuals find the issue personally involving when the message was endorsed by an attractive source and an expert, respectively.

Factors that change one's ability include distraction, message repetition, time pressure (Moore, Hausknecht, & Thamodaran, 1986; Ratneshwar & Chaiken, 1991), communication modality (Chaiken & Eagly, 1983), knowledge and expertise (Alba & Marmorstein, 1987), direct experience with attitude objects (Wu & Shaffer, 1987), positive mood (Mackie & Worth, 1989), and anxiety (Jepson & Chaiken, 1990). For a detailed discussion about these factors, see Eagly and Chaiken (1993).

According to the dual-process model, when motivation or ability for elaboration is low, judgments are subject to situational cues in the absence of deliberation. For example, decision makers tend to use simple decision rules such as "experts' statement can be trusted" or "consensus implies correctness." As a result, they are more likely to agree with the experts' opinion or flock to the majority's evaluation.

Information about a product's popularity may provide such a basis (Shah & Oppenheimer, 2008). To this extent, it may play the same role as other heuristics do. That is, when consumers feel less motivated or do not have enough cognitive ability to comprehend all of the available information, they may be more likely to use product popularity to make judgments. For example, when consumers need to evaluate options that they have never been aware of or they do not have general product category knowledge to evaluate them, choosing an ideal option may be a challenging task. In this case, decision uncertainty and consumer knowledge influence consumers' motivation and/or their ability to process information carefully. Hence, the effect of product popularity on information processing depends on these two factors. In the next section, I

will review the relevant literature about how these situational and individual factors increase or decrease the effect of product popularity on consumer decisions.

2.3.2 Situational factors: High decision uncertainty

The effect of others' opinions is likely to increase with decision uncertainty (Baron, Vandello, & Brunsman, 1996; Gino & Moore, 2007; Mackie, 1987; Sasaki et al., 2011). This is probably because when a decision outcome is not obvious, people tend to assume that the group's opinion "reflect[s] objective reality and others' decisions are based on information that they personally do not possess" (Bonabeau, 2004; Mackie, 1987).

Much research provides supporting evidence. Roselius (1971) show that when people perceive the risk of making the wrong decision to be high, they believe that others' opinions will help to relieve the perceived risk. Thus, they may seek advice from others (Dowling & Staelin, 1994). Likewise, people tend to put more emphasis on what others believe when a decision is complex. In a recent study, Gino and Moore (2007) show that people tend to overweight advice if a task is difficult and underweight it if a task is easy. Similarly, Sasaki and colleagues (2011) indicate that people are more likely to choose the most popular option when the amount of attribute information provided is large, thereby exceeding their capacity to process it.

Moreover, the tendency to follow others' evaluations tends to be strong when the value of the outcome for any individual is relatively difficult to determine. For example, participants in an experiment by Wooten and Reed (1998) viewed a histogram of positive or negative ratings of paper tissue that were ostensibly provided by sixteen students in an earlier experiment. Then,

they evaluated the quality of the tissue. However, some participants were able to determine the product quality by wiping up a spill with the towels, whereas others could only test the paper towel's quality by rubbing or ripping it. As expected, participants were more influenced by previous consumers' product ratings in the second case than in the first.

However, the importance of the task can also play a role. That is, people are less likely to conform to others' opinions when a task is not important. In a study by Baron, Vandello and Brunsman (1996), participants along with confederates viewed a series of pictures, and then responded to questions about them. Each picture was presented for either 1 second or 10 seconds. Participants based their responses on confederates' (incorrect) answers only when (a) the pictures were presented for a short time and (b) they believed that their responses were important rather than part of a pilot test.

These findings suggest that when decision uncertainty is high, consumers are more likely to rely on product popularity than on attribute information that is more difficult to evaluate. However, this tendency may depend on individually differing factors such as product category knowledge, as will be described in the following section.

2.3.3 Individual factors: The effect of consumer product knowledge on information processing strategy

Consumers' information processing strategy can depend on their product category knowledge. In general, knowledgeable consumers have greater ability (Alba & Hutchinson, 1987) and motivation to process product information (Mehta et al., 2011; Nam et al., 2012),

whereas consumers with little product category knowledge may feel both unable and unmotivated to do so. Therefore, the strategy that consumers use to process product information may differ.

Several studies have investigated this difference. Knowledgeable consumers are more likely than novices to engage in demanding evaluation strategies. Therefore, they tend to devote more cognitive resources to the processing of messages and generate a greater number of thoughts about the message content (Edell & Mitchell, 1978; Maheswaran & Sternthal, 1990; Sujan, 1985). For example, Nam, Wang, and Lee (2012) found that experts are more likely than novices to consider the non-alignable attributes of a product (i.e., attributes that are not comparable to those of alternative products) when making product evaluations and decisions.

In contrast, less knowledgeable individuals tend to limit their decision effort. For instance, they tend to focus more on “nonfunctional" attributes (e.g., brand name and price) than on attribute information when evaluating product information (Park & Lessig, 1981). In addition, Ratneshwar and Chaiken (1991) showed that participants with limited ability to comprehend product information relied more on the expertise of the product’s inventor when evaluating a product. Although the effect of consumer knowledge was not the focal point of their research, their work has important implications for the nature of this effect. That is, when participants had limited ability to process product information, they felt more positively about an unfamiliar product if it was invented by an expert rather than a novice. When they felt they had the ability to evaluate the product, however, their evaluations did not depend on the inventors’ expertise. Thus, they tended to rely on the expertise of the source only when they personally lacked the ability to evaluate the product information.

Some research has shown that knowledgeable consumers' ability and motivation may have the opposite effect. Specifically, because knowledgeable consumers are more effective information processors (Alba & Hutchinson, 1987), they may seek out less attribute information (Radecki & Jaccard, 1995)**,** spend less time making decisions and examine fewer options (Lee, Herr, Kardes, & Kim, 1999).

Overall, however, existing research converges on the notion that knowledgeable consumers are able and motivated to comprehend product attribute information while unknowledgeable consumers tend to rely on heuristics in order to minimize their decision effort. This different processing tendency affects how consumers react to product popularity when making product evaluations. That is, depending on consumers' knowledge level, product popularity may make the product evaluation more or less complicated. The detailed discussion about this difference in product information processing will be discussed in the following section.

2.3.4 The role of consumer knowledge on the effect of product popularity on attribute information processing

The previous discussion indicates that the level of consumer knowledge leads to different processing styles when individuals use product popularity. On the one hand, consumers with little product category knowledge may give relatively more weight to heuristic cues. Hence, they may tend to use others' opinions as a decision shortcut, increasing the heuristic impact of product popularity on their evaluation (Brucks, 1985).

On the other hand, research also suggests that when people feel confident in their product knowledge, they may consider information about others' opinions to be disruptive when making product evaluations. Therefore, they may ignore others' opinions. In a study by Brucks (1985), for example, participants were given an opportunity to explore information about different types of sewing machines along with salespersons' opinions. When they felt confident of their knowledge about the product category, they were less likely to seek and rely on a salesperson's recommendation. In some cases, this tendency may result in less accurate judgments. Yaniv (2004) reported that knowledgeable participants gave greater weight to their own opinions and discounted others' opinions in a memory task. As a result, they benefitted less from these opinions than less knowledgeable participants did.

Furthermore, knowledgeable consumers may be annoyed by others' opinions. When individuals know the available options well enough to have a strong a priori preference, exposure to others' opinions causes conflict with this preference, generating emotionally (Fitzsimons & Lehmann, 2004) and cognitively negative outcomes (Goodman et al., 2013). In a study by Fitzsimons and Lehmann (2004), for example, participants evaluated two attractive and two unattractive product options along with a product recommendation. In one condition, the valence of the recommendation was congruent with the product's attractiveness; in another case, it was incongruent. Participants experienced greater decision difficulty, lower decision satisfaction, and greater psychological reactance in the second condition than in the first. Thus, their decisions were typically opposed to the recommendation. (That is, they were more likely to choose the attractive option when a negative recommendation was provided than when a positive one was provided.) In addition, ads that conveyed a product's popularity (e.g., "bestseller") that conflict with knowledgeable consumers' preexisting preferences can increase decision difficulty and

decrease their motivation to make a purchase (Goodman et al., 2013). Both of these studies therefore provide evidence that others' opinions about products (e.g., an expert's recommendation or a bestseller sign) can conflict with knowledgeable consumers' existing preferences, decreasing their decision satisfaction.

2.3.5 Summary and discussion

The preceding discussion indicates that consumers' reaction to product popularity depends on situational and individual factors. When decision uncertainty is high and consumers lack product category knowledge, they may use product popularity as a mental shortcut to cope with decision uncertainty. In this case, product popularity has a positive influence on their evaluation. When consumers feel confident about their product knowledge, however, they tend to ignore others' opinions or even react against them.

However, this conclusion may hold only when the level of consumers' general knowledge coincides with their knowledge about the particular assortment. That is, people who are knowledgeable about a type of product are frequently assumed to know a good deal about the specific products of that type. Previous research on the effect of knowledge (e.g., Fitzsimons and Lehmann, 2004, Yaniv, 2004, and Goodman et al., 2013) has typically been based on this assumption. Outside of the laboratory, however, consumers are often faced with a set of unfamiliar options regardless of their level of product knowledge, which leaves them feeling uncertain about the options for which they lack a priori preferences. As mentioned earlier, manufacturers and retailers keep updating their product assortment in an attempt to better meet the needs of target consumers (Kahn, 1998; Kotler, 1991) and introducing exclusive brands that

are sold only in specific stores (e.g., Blueberry Muesli cereal at Trader Joe's). Accordingly, even though consumers feel confident about their general knowledge about a cereal, for example, it is impossible for them to know about all the cereal options in a store.

However, existing research has not fully examined the effect of product popularity when consumers' general product category knowledge is not directly useful for evaluating particular options. Hence, it is not clear whether knowledgeable consumers who consider unfamiliar options respond to popularity information in the way that previous research suggests (i.e., ignoring or becoming annoyed by the information). In this thesis, I reveal the effect of popularity in this unexplored situation.

CHAPTER 3 CONCEPTUAL DEVELOPMENT

I suggest that when consumers' knowledge about the general product category is not useful for consumers to evaluate unfamiliar options in a given assortment, the effect of product popularity on consumer decision is not obvious. I hypothesize that product popularity makes consumers perceive what they do not know by providing a point of comparison between their own and others' knowledge about the particular options. Furthermore, I expect that knowledgeable people tend to be more sensitive to this knowledge discrepancy than those with limited product category knowledge. Additionally, I argue that this tendency persists when making a decision is more versus less psychologically demanding.

To explain this unrevealed effect of product popularity, I introduce the concept of epistemic curiosity or the desire for particular type of knowledge. In this chapter, I briefly review research bearing on the impact of epistemic curiosity and develop a theoretical framework to explain the effect mentioned above.

3.1 Epistemic Curiosity

In this section, I will discuss the general effect of epistemic curiosity resulting from the feeling of not-knowing and its implications for consumer decisions.

3.1.1 General effect of epistemic curiosity

Epistemic curiosity is the feeling of deprivation that results from awareness of a gap between what one knows and what one wants to know (Loewenstein, 1994). Research provides several determinants of epistemic curiosity such as the importance of questions and violated expectations (Golman & Loewenstein, 2012; Loewenstein, 1994), novelty, ambiguity and uncertainty (Silvia, 2008; Spielberger & Starr, 1994), as well as one's knowledge about a topic (van Dijk & Zeelenberg, 2007).

Once aroused, epistemic curiosity may stimulate attempts to satisfy it (Litman & Jimerson, 2004; Litman & Lunsford, 2010; Loewenstein, 1994). That is, when the answer to a question is not known, curious individuals are often intrinsically motivated to attain the answer (Berlyne, 1954a; Berlyne, 1960; Berlyne, 1966). This phenomenon is commonplace in daily life. For instance, when people watch someone chuckle as he or she reads a news article, they may be curious as to the article's content and be more motivated to read the article themselves than they otherwise would be (Loewenstein 1994).

Curious individuals' desire to reduce their feeling of uncertainty can persist even when a cost is incurred in order to satisfy this desire. In a study by Kang and colleagues (2009), for example, participants were asked questions about their general knowledge (e.g., "What instrument was invented to sound like a human singing?"). The results showed that participants who were more curious about the answers devoted more resources to attain them (Kang et al., 2009).

Furthermore, epistemic curiosity leads people to make decisions that they would usually be reluctant to make. In a study by Van Dijk and Zeelenberg (2007), participants had to choose

either €15 or a sealed package as a reward for their participation. In one condition, no additional information about the package was provided. In a second, participants were given limited information about the shape of the package content (e.g., round or not round). In addition, participants in an "unconditional feedback" condition were informed about what was in the package at the end of the session, regardless of their reward choice. However, in the "conditional feedback" condition, only those who chose to receive the package were informed about its content. The results showed that, in the conditional feedback condition, participants were more likely to opt for the sealed package than for the €15 when they had some knowledge about its content. The authors suggested that these participants experienced greater curiosity and, therefore, were motivated to resolve it by choosing the uncertain option over the other with clear monetary value. Although individuals usually like to avoid making a decision they might regret, they may nevertheless make such a decision because of their curiosity about the unknown package (van Dijk & Zeelenberg, 2007).

Evidence of the effects of epistemic curiosity in consumer research is limited. However, Menon and Soman (2002) showed that when participants viewed an ad about an ambiguous product (e.g., SONY QV), those who were given a small amount of information about the target product (e.g., an indication of the product category: "SONY QV is a camera") showed greater epistemic curiosity than individuals who did not have this information. As a result, they spent a relatively longer time looking at the ad and asked more questions about the product being advertised.

3.1.2 The effects of epistemic curiosity on the impact of product popularity

Although consumers may frequently be faced with a decision situation that requires them to consider a number of unfamiliar options in spite of their general product category knowledge as described in page 3 and 21, their feeling of not-knowing about unfamiliar options may become salient *only after* they compare their knowledge about the particular options to others'. As noted by Loewenstein (1994), people make different judgments depending on their reference point. Thus, people are not always aware of their feeling of not-knowing until they compare themselves with others who seem to be able to identify good options among an assortment with which they are unfamiliar.

To illustrate, when consumers view a list of unfamiliar cakes on a menu, they may think "I am not sure what to choose since everything looks so good." However, if popularity information about the cakes is available, they may realize that others know more about these unfamiliar cakes than they do, making their feeling of not-knowing about the specific list of alternatives more salient. In other words, by implying that others know a good deal about these unfamiliar options, product popularity may act as a point of comparison between their knowledge and others' about a specific assortment, thus triggering epistemic curiosity.

Hence, I suggest that product popularity increases the salience of the gap between what people know (their general product category) and what they wish to know and what others seem to know (knowledge about the particular options).

3.1.3 Epistemic curiosity and consumer knowledge

Epistemic curiosity is positively related to one's knowledge in a particular domain (Loewenstein, 1994). As one gains knowledge about a particular topic, two things can happen. First, knowledgeable individuals become more likely to focus on what they do not know rather than what they do know. This tendency may be strong when the discrepancy between the two is moderately large. This prediction was supported by previous studies. Berlyne (1954b) showed that participants experienced greater curiosity about answers to questions about familiar animals than unfamiliar ones. Jones (1979) also found that participants felt more curious about answers to questions when they had some knowledge about the topic to which the questions pertained than when they had little or no knowledge about it. Van Dijk and Zeelenberg's (2007) experiment that I described earlier also suggests that participants with some knowledge about an uncertain object experienced greater curiosity than those without it. These studies show that people feel curious when the gap in their knowledge is moderate rather than small or very large.

Second, individuals' curiosity may be related to their belief that they can decrease the gap in their knowledge (Loewenstein, 1994). Because people's curiosity reflects a desire to close the gap in their knowledge, their curiosity will be greater when they perceive that this goal can be accomplished. For example, if consumers possess high level of general product knowledge, they may feel that comprehending the product information is a doable task while consumers with low product knowledge may consider that the task is hard to do. As a result, the former group of consumers may feel more curious about the options than the latter group

These considerations indicate that if people feel confident about their general product knowledge but not about a particular set of options, product popularity makes the possible gap in

their knowledge more salient. Because they are likely to be sensitive to their feeling of not-knowing about the particular assortment, they may feel curious about it and therefore, may be intrinsically motivated to resolve it. However, when people have little product category knowledge, they may not feel much curiosity.

However, knowledgeable consumers' epistemic curiosity may depend on how demanding a decision is perceived to be.

3.1.4 Epistemic curiosity and size of assortment

Consumers tend to perceive a choice task to be psychologically demanding when the number of unfamiliar options is large. In particular, choosing from a large assortment can lead to information overload (Gourville & Soman, 2005). As a result, the availability of many different options can lead to two conflicting outcomes. Although consumers prefer choosing from larger assortments, the availability of many different options can demotivate consumers (Iyengar & Lepper, 2000) because they are overwhelmed by the perceived demand of the decision.

When making a decision is demanding, consumers tend to rely on cognitively effortless decision processes (Fiske & Taylor, 1984; Johnson et al., 1988). Thus, they may rely on popularity information rather than on attribute information. This inclination to rely on product popularity is prevalent when unknowledgeable consumers make choices from among a number of unfamiliar options. Accordingly, they may opt to use product popularity information as a decision shortcut rather than feel curious about the assortment.

However, the role of assortment size may function differently for knowledgeable consumers. I expect that their feeling of not-knowing may be more prominent when the assortment is large than small because product popularity would emphasize what others have done in the demanding situation. That is, product popularity in a large assortment leads knowledgeable consumers to notice that in spite of the high demand in the assortment, others are able to distinguish the good ones among the options.

In addition, those with high confidence in their knowledge may feel that if others are able to determine the best options in the assortment, they should be able to do so, too. Hence, knowledgeable consumers may perceive their knowledge gap to be more resolvable with than without product popularity. Hence, I expect that even though making a decision from among a large, unfamiliar assortment is often believed to be demanding, the intensity of consumers' curiosity would be increased.

When product popularity information is available in a small assortment, however, knowledgeable consumers' feeling of not-knowing may not be as prominent and they may feel less curious. I speculate that because of their confidence in their product category knowledge, they may perceive making a choice from the less demanding assortment as a simple task that anyone could do, decreasing the salience of the knowledge gap.

Taken together, when product popularity information is available, knowledgeable consumers' tendency to reduce the apparent gap in their knowledge would be stronger in a large than small assortment. Accordingly, they would deliberate on the product attribute information to resolve their curiosity. However, this is not the case for those with limited product knowledge.

3.2 Summary and Hypotheses

To summarize the implications of the preceding analysis, providing information about products' popularity may make knowledgeable consumers aware of the gap between their general knowledge about the product category and their knowledge about the particular products being considered. Consequently, they may feel curious about the assortment and, therefore, think more carefully about the products' attributes to resolve their curiosity. As a result, the attributes are likely to have a greater impact on their judgments than they would if popularity information was not provided.

In contrast, consumers who feel they have little knowledge about the category of products they are considering are likely to have little confidence in their ability to evaluate the information about the products' attributes. Therefore, they perceive the decision to be demanding and therefore may be likely to rely on product popularity when evaluating the products.

These considerations lead to the following hypotheses:

H1: The presence of product popularity information will increase knowledgeable consumers' consideration of product attribute information.

H2: The presence of product popularity information will increase knowledgeable consumers' willingness to make a purchase.

H3: The presence of product popularity information will increase knowledgeable consumers' decision confidence.

H4: The effect of popularity cues on knowledgeable consumers' purchase intention [decision confidence] will be stronger when the choice set size is large than when it is small.

H5: Attention to product attribute information will mediate the effects of popularity on consumers' purchase intention to a greater extent when the choice set size is large than when it is small.

H6: The impact of attribute information on consumer judgment will increase with participants' perception of their general knowledge about the product category to which choice alternatives belong.

Three experiments examined the implications of these hypotheses. Experiments 1 and 2 show that cues indicating product popularity increase knowledgeable consumers' attention to product attribute information, leading to greater intention to purchase and greater decision confidence. Experiment 3 shows that popularity cues increase the impact of product attribute information on knowledgeable consumers' product evaluations but not on unknowledgeable consumers' evaluations. Moreover, the effect of popularity cues on deliberative processing is observed regardless of whether participants' perception of their product knowledge is assessed (Experiment 2) or experimentally manipulated (Experiment 3).

CHAPTER 4 EXPERIMENTS

4.1. Experiment 1- The effect of product popularity on decision outcome

This experiment showed that (a) knowledgeable consumers engage in more deliberative processing in the presence of popularity cues and (b) this greater processing leads to stronger purchase intention. Furthermore, the effects are more evident when the choice demand is high (i.e., the choice set size is large).

4.1.1 Operationalization of key variables

Perceived popularity. Many studies on product popularity have used the actual number of options chosen or sold as an index of popularity. For example, Tucker and Zhang (2011) used the number of clicks on link to a target online shopping mall that previous visitors had made and Salganik and colleagues used the number of downloads of songs (Salganik et al., 2006; Salganik & Watts, 2008) as a proxy for popularity.

Instead of the actual number of options chosen, recommendation signage has been often used to imply the popularity of products. Cai et al. (2009), for instance, wrote the names of the five most popular dishes on a table sign to manipulate item popularity based on actual sales from the previous week. Additionally, Goodman and colleagues (2013) tried a simple manipulation of popularity by affixing a red "Best Seller" sign to products' name cards (Goodman et al. 2013).

In my studies, product popularity was manipulated in a similar way by using icons shaped like people, which were designed to signal how many consumers had chosen each option. For example, in the presence of product popularity condition, all three of the people icons were shaded for some of the options whereas in the absence of product popularity condition, these icons were not available (see Appendix A, B, and C for study materials). A detailed description of this product popularity manipulation will be included in the methods section for each experiment.

Product category knowledge. Research on consumer knowledge has identified two types of knowledge: objective and subjective knowledge (Brucks, 1985; Park & Lessig, 1981). According to Park and colleagues, the former is the storage of accurate information about the product class in long-term memory and the latter is people's perceptions of what or how much they know about a product class (Park, Mothersbaugh, & Feick, 1994).

The level of objective product knowledge has been operationalized in terms of actual knowledge about a specific product. This includes product familiarity (product experience) and expertise (the ability to perform product-related tasks successfully) (Alba & Hutchinson, 1987). Hence, some studies use a list of questions to measure participants' knowledge. For example, Brucks (1985) constructed a set of questions about a target product (sewing machine) based on pretests. The questions covered several aspects of sewing machine knowledge including terminology, available attributes, criteria for evaluating attributes and sewing usage situations.

In some studies, objective product knowledge was manipulated. Park, Gardner, and Thukral (1988), for instance, provided different amounts of product information to subjects prior to the main experimental task. Subjects in the low knowledge condition received basic

information about the product (e.g., what a videocassette recorder is and what it does). On the contrary, subjects in the high knowledge condition received a detailed description of five major product characteristics (price; format; quality of picture at fast, slow, and slowest speeds) and their relationship to usage outcomes (e.g., efficient use of recording tape) as reported by Consumer Reports in addition to the same basic information given in the low knowledge condition (Park, Gardner, & Thukral, 1988).

The level of subjective product knowledge has often been measured with different types of scales. For example, Brucks (1985) used two scales to measure participants' subjective product knowledge about sewing machines in general. Participants were asked to rate their knowledge of sewing machines as compared to the average woman on a seven-point scale (e.g., least knowledgeable (1) to most knowledgeable (7)). Then, they were asked to rate their familiarity with sewing machines on a seven-point scale (not at all familiar to extremely familiar).

Subjective knowledge can be manipulated. In a study by Xu and Wyer (2010), all participants were told that an agency wanted to know college students' general knowledge about fabrics and they completed a knowledge assessment questionnaire containing 20 binary choice questions about fabrics. However, the types of questions they were asked and feedback they received varied by condition. That is, in the high relative knowledge condition, participants received questions that were relatively easy but were told that more than 90% of previous respondents had found the questions very difficult and had answered fewer than five questions correctly. In contrast, in the low relative knowledge condition, the knowledge assessment questions were difficult but participants were told that more than 90% of previous respondents had found these questions easy and had answered more than 15 questions correctly.

In my experiments, both types of knowledge (objective and subjective knowledge) were studied. To measure participants' objective knowledge, their experience and expertise about a target product was measured based on Alba and Hutchinson's (1987) distinction. In addition, participants' subjective knowledge was manipulated by following Xu and Wyer (2010). The specific information about these two approaches will be found in the methods section for each experiment.

Cognitive demand. Researchers have manipulated cognitive demand in different ways by varying the amount of information people need to process. For example, Lavie and colleagues suggest, based on load theory, that cognitive demand is closely tied to demands on working memory (Fitousi & Wenger, 2011; Lavie, Hirst, de Fockert, & Viding, 2004). Hence, the more information participants need to remember, the more resources are required, leaving little to devote to the current task. In one well-known test, for example, participants are presented with and required to remember a set of either one or six digits in low and high cognitive demand conditions, respectively. A simple task is given to them followed by a memory task which asks participants to recall the set of digits they viewed earlier. The critical finding is that participants' task performance is low under the high cognitive demand condition because participants in this condition did not have enough cognitive resources to perform the task well. Similarly, Jacoby (1984) identified three cases of cognitively demanding situations in a more marketing context: varying the number of product attribute descriptions, the number of available options, and a mixture of varying the number of attributes and the number of options.

Each of these three cases can easily be created in an experimental setting For example, the high cognitive demand condition can be created by adding either additional product attributes (options) to the attributes (options) in the low cognitive condition, resulting in more product

attribute (options) in the high than the low cognitive demand condition. However, if the number of product attributes is varied across conditions, the additional product attribute information may be familiar to some but not all knowledgeable participants, for example. As a result, manipulating the cognitive demand alongside the number of product attributes might result in an unintentional influence on the level of product knowledge. The third approach (varying both the number of attributes and options) may suffer from the same problem.

Since the level of consumer knowledge within the high and low demand conditions should be consistent, I chose to differentiate choice tasks requiring high and low cognitive demand by varying the number of available options.

The Level of Cognitive Demand. The number of available options is referred to as assortment size. Previous research on assortment size has defined it as the total number of SKUs offered in that category (Broniarczyk, Hoyer, and McAlister 1998, 166-176), shelf-space allocation (Mcintyre, Shelby H. 1999), or the number of options available at the time of making choices (Iyengar and Lepper 2000, 995-1006; Sela, Berger, and Liu 2009, 941-951; Diehl and Poynor 2007, 160-161).

I will follow the last definition because the goal of my thesis is to investigate the effect of product popularity when a gap in consumers' knowledge exists rather than consumers' response to an actual product assortment in a store (where the first or second definition of assortment size might be useful).

A number of studies based on the chosen definition have used two types of assortment sizes (Diehl & Poynor, 2010; Iyengar & Lepper, 2000; Sela, Berger, & Liu, 2009; White & Schlosser, 2006). One type is an extensive-choice in which participants would have to consider a

reasonably large, but not ecologically unusual, number of options. The other type is a limited-choice with a relatively small number of choices. In these studies, a smaller sized assortment is operationalized as an assortment which includes approximately six options while a larger sized assortment is one that includes approximately twenty-four options (White and Schlosser 2006, 308-309; Iyengar and Lepper 2000, 995-1006). Based on this previous research, I will use six different options for a smaller sized assortment and twenty-four different options for a larger sized assortment.

4.1.2 Methods

Subjects and Design. Seventy-nine undergraduate students participated for course credit. They were assigned to one of the four cells of a 2 (popularity cues: present vs. absent) × 2 (choice set size: large vs. small) between-subject design.

Selection of Stimuli. Cheesecake was selected as the target product because this category was familiar to students in the population from which subjects were drawn. However, the particular items in the choice set were novel. Pretesting was conducted to eliminate alternatives that were perceived to be conventional and to have familiar flavors, leaving 24 cheesecakes with unique names and various flavors (e.g., Turtle Trio, Gentlemen's Whiskey Torte, and Uptown cheesecake). Hence, participants had a high level of knowledge about the product category but were not familiar with the specific choice alternatives.

Construction of Stimuli. Four sets of materials were constructed, two for each choice set size. First, the number of options in a choice set was varied, one set for a large size assortment

composed of 24 cheesecakes and the other set for a small size assortment in which six options were randomly selected from among the 24 items in the large set.

In the *no-cue* conditions, only the names and descriptions of the cheesecakes were listed. In the *popularity-cue* conditions, all product descriptions were accompanied by three people-shaped icons, either two or three of which were shaded blue to denote their relative popularity, average and higher popularity, respectively. In each listing, half of the cakes were tagged with three blue icons and half with only two out of three. (see Appendix A for the study stimuli.)

Procedure. Participants were introduced to the computer-based experiment with instructions to choose a cheesecake in a hypothetical cake shop called "The Gourmet Cheesecake," which they might find on campus. They were asked to imagine a situation in which they would need to find a cheesecake for a dinner at a friend's house. They were informed that the cake shop had a variety of flavors of cheesecakes, which were all similar in quality and price.

The menu of 24 or six types of cheesecake was presented simultaneously on a computer screen. After viewing the items, participants chose the one they were most likely to buy. They then indicated their intention to purchase the cake they had chosen along three scales from 1 (extremely unlikely/impossible/improbable) to 7 (extremely likely/possible/probable) ($\alpha = .95$). Participants then indicated to what extent they had carefully considered the descriptions (attribute deliberation) on a scale from 1 (not at all) to 7 (very much) and reported their difficulty in making a decision along a scale from 1 (extremely difficult) to 7 (extremely easy). For clarity, responses to the latter item were reversed so that higher numbers indicated greater difficulty.

As manipulation checks, participants then indicated the size of the assortment along a scale from 1 (extremely small) to 7 (extremely large) and whether the menu they had seen

indicated each item's popularity along a scale from 1 (strongly disagree) to 7 (strongly agree). Finally, participants answered demographic questions regarding their age, gender and English proficiency, and were then debriefed.

4.1.3 Results

Data were analyzed as a function of cueing (popularity cue vs. no cue) and choice set size (large vs. small) using participants' English proficiency as a covariate.

Manipulation Checks. The manipulation of the choice set size was successful. Participants reported that the assortment they had considered was larger in large assortment than in small assortment conditions (5.71 vs. 4.27, respectively; F (1, 74) = 28.83, $p < .0001$). The cue manipulation was also effective; participants agreed more strongly that the cheesecake assortment included popular cheesecakes in the popularity-cue condition than in the no-cue condition (5.51 vs. 5.00, respectively; F (1, 74) = 4.40, $p < .05$). No higher order effects were significant.

Purchase Intention. Participants' willingness to purchase the cake they had chosen, their reported consideration of product attribute descriptions, and the difficulty of making a choice are summarized in Table 1 as a function of choice set size and the presence of popularity cues. Analysis of purchase intention revealed a significant interaction of these variables (F (1, 74) = 4.47, $p < .05$). Specifically, when the choice set size was large, participants reported greater purchase intention when popularity cues were provided than when they were not (6.20 vs. 5.48, respectively - directional F (1, 74) = 4.9, $p < .03$), whereas when the choice set size was small,

purchase intention was not dependent on the presence of popularity cues (5.67 vs. 6.05, respectively; $F < 1$, ns).

Table 1--Results of Experiment 1

	Popularity cues (SD)	No cues (SD)
Intention to purchase		
Small choice set	5.67 ab (1.08)	6.05 ab (1.39)
Large choice set	6.20 b (.72)	5.48a (.95)
Attribute deliberation		
Small choice set	6.14 ab (1.39)	6.68 b (.65)
Large choice set	6.40 b (.99)	5.70 a (1.45)
Choice difficulty		
Small choice set	3.59 a (1.30)	3.23 a (1.41)
Large choice set	4.00 a (1.77)	3.45 a (1.54)

Cells in each subtable with different subscripts differ directionally at $p < .05$.

Attribute Deliberation. I expected that popularity cues would increase participants' attention to attribute descriptions when the choice set size was large but not when it was small. This expectation was confirmed, as shown in the second section of Table 1. Analyses of these data yielded a significant interaction of cueing and choice set (F (1, 74) = 4.95, $p < .05$). When the choice set size was large, participants reported deliberating more on the attribute descriptions

when popularity was cued than when it was not (6.40 vs. 5.70, respectively; F (1, 74) = 3.03, $p_{\text{one-tailed}} < .05$). When the choice set was small, however, participants reported considering attribute descriptions nonsignificantly less in the former condition than in the latter (6.14 vs. 6.68, respectively; F (1, 74) = 2.33, $p > .10$). These data are therefore consistent with H1 that when a set of choice alternatives is large, providing product popularity cues does not increase the use of these cues as a heuristic. Rather, it increases attention to product attribute information. However, this is not true when the choice set was small.

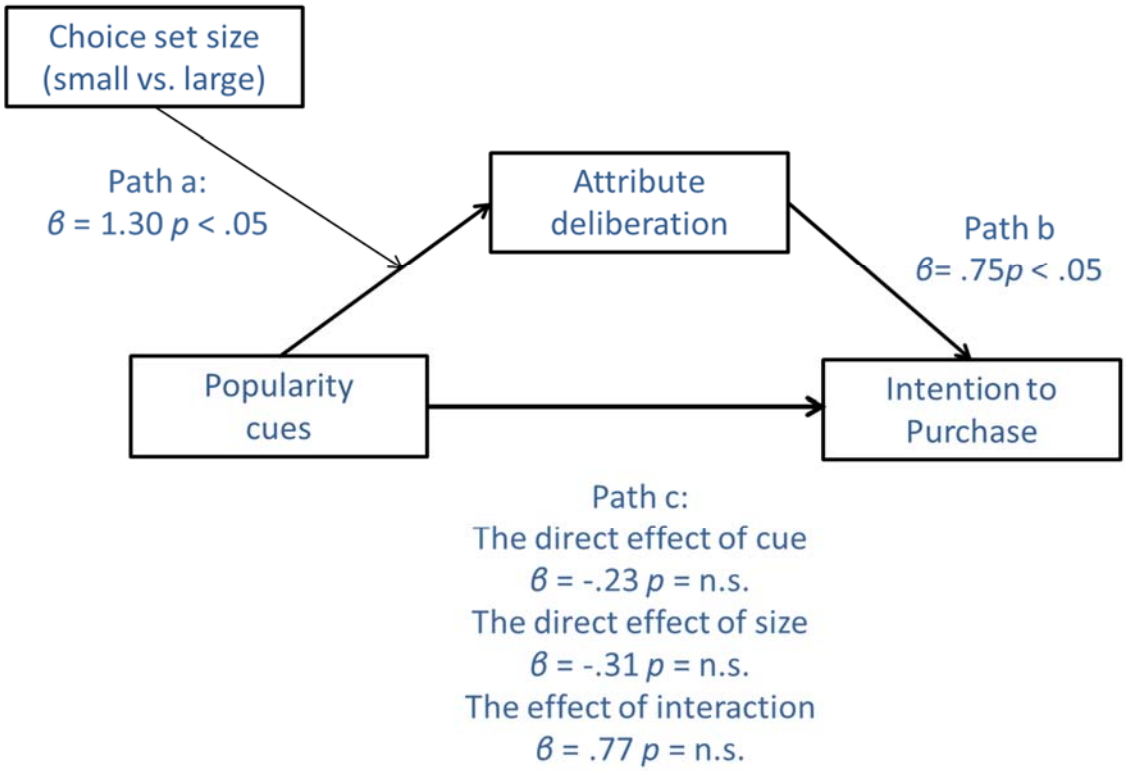
Choice Difficulty. No differences in choice difficulty were evident**.** I provide an explanation for this result in the discussion section below.

Mediation analysis. Considered in isolation, the effects of popularity cues on purchase intention could be attributed to the use of these cues as information. I speculated, however, that the effects are mediated by the effects of these cues on attention to the attribute information. Mediation analyses confirmed this speculation. Bootstrapping analyses (Hayes, 2012; Muller, Judd, & Yzerbyt, 2005; Zhao, Lynch Jr, & Chen, 2010) indicated that the interactive effect of cueing and assortment size on intention was indeed mediated by its effect on attribute deliberation as I expected in H5; for 1000 bootstrapping samples, 95% CI: 0.0559 to 0.7822, excluding 0.

In addition, as shown in Figure 1, the results showed that both the direct effect of the cue by size interaction on attribute deliberation (path a) and the direct effect of attribute deliberation on purchase intention were significant (path b), $\beta = 1.20$, $p < .05$ and $\beta = .25$, $p < .05$, respectively. Also, consistent with the requirements for mediation, the conditional indirect effect of the product of paths a and b is significant (path a × b), with a 95% confidence interval,

excluding zero (-.40 to -.003 for small and .01 to .57 for large choice set condition). Furthermore, whereas a × b is significant, path c, which reflects an estimate of the direct effect of the independent variables and its interaction effect on purchase intention, is non-significant. Thus, attribute deliberation functioned as a mediator of purchase intention.

Figure 1-Mediaton analysis in Experiment 4-1



4.1.4 Discussion

When participants made a decision about a product in a category about which they had knowledge, the effect of popularity cues depended on the size of the choice set. When the choice set was large, the presence of these cues led participants to consider product attribute descriptions more carefully, and these descriptions apparently had a greater effect on their purchase intention. In contrast, this effect was not evident when the choice set was small.

Choice difficulty was not varied much across conditions even though choice set size had a significant main effect. Although this was not a main goal of Experiment 1, this pattern of data is interesting for at least two reasons. First, research supporting a choice overload hypothesis (e.g., Diehl and Poynor 2007; Iyengar and Lepper 2000; Mogilner, Rudnick, and Iyengar 2008) implies that a large choice set results in greater choice difficulty than a small choice set. Second, if participants deliberated on attribute information in a large (vs. small) popularity cued condition, it is reasonable to speculate that they experienced greater choice difficulty.

However, recent research points out that a variety of factors moderate the impact of assortment size on choice overload (Scheibehenne, Greifeneder, & Todd, 2010), such as individual factors (e.g., expertise or preference) and the complexity of the decision problem (the nature of product attributes) (Chernev, Bockenholt, & Goodman, 2010). In addition, the perceived ease or difficulty of processing information is subjective (e.g., Schwarz, 1998, 2004, and Winkielman, Schwarz, Fazendeiro, & Reber, 2003). Hence, it is possible that while knowledgeable individuals try to resolve their curiosity, they may not perceive careful consideration of attribute information as a difficult task. I elaborate more on this finding and its implications in Chapter 5.

4.2 Experiment 2- The role of product knowledge in decision outcomes

Because participants in Experiment 1 were knowledgeable about the product category, the effects of product knowledge could not be directly examined. In Experiment 2, the category (upscale beer that was not widely available) was one about which individuals were likely to have different amounts of knowledge. By assessing these individual differences, I obtained evidence that popularity cues had different effects on knowledgeable and unknowledgeable participants' attention to product attribute information and that this attention was mediated by its effects on epistemic curiosity.

4.2.1 Methods

Subjects and Design. Ninety-three undergraduates participated to fulfill a course requirement. They were randomly assigned to conditions of a 2 (popularity cues: present vs. absent) × 2 (choice set size: large vs. small) between-subjects design. Also, participants' experience and expertise with the target product was measured and these responses were used as an index of product knowledge.

Selection of Stimuli. The focal product category in this experiment was beer. As in Experiment 1, relatively unfamiliar types of beers were chosen for constructing stimuli, such as

Dogfish Head World Wide Stout, Honeywater Motor Boat Ale, and The Bruery Black Tuesday. These beers were selected from a website (www.ratebeer.com) based on rating, origin, and name: The highest rated beers (stout, ale, and porter) brewed in America, England, and Australia were selected. Furthermore, the attribute descriptions associated with these products were modified to include only attributes such as flavor, body, color, and smell. For example, one description read:

> *Dogfish Head World Wide Stout*: This stout is one of the world's strongest dark beers. Dark, rich, roasted, and complex, World Wide Stout is like a fine port.

A second read:

> *The Bruery Black Tuesday*: Aged in bourbon barrels for over a year, this extremely rich stout has picked up flavors of vanilla, burnt caramel, toasted oak, prunes, and sherry-like oxidation.

Construction of Stimuli. Three stimulus changes were made in Experiment 2 to better reflect actual retail settings and for greater experimental control. First, the proportion of popularity cued items was decreased from one-half to one-third, thus making popular options less salient. Second, because it is rare to see cues indicating lower popularity than others, products in the popularity cue conditions had either three icons highlighted or no icons at all. Hence, eight out of 24 products were displayed with popularity cues while the rest had attribute descriptions without any cues. Finally, to construct small choice sets, four different subsets of the 24 beers in the large set were used, each set consisting of six items. Thus, pooled over the four

subsets, each product was represented an equal proportion of times in each set size condition. Data were pooled over the four types of small beer assortments in the analyses to be reported.

Procedure. The procedure was similar to that of Experiment 1. Participants were introduced to the experiment with the information that researchers were interested in students' reactions to products of the sort they might encounter in everyday life and, on this pretense, were shown a list of beers on the computer screen. After viewing the list of beers on a computer screen, participants were asked to choose the option they were most likely to buy. They then indicated their intention to purchase the beer they had chosen on the scales used in the earlier experiment. Participants then indicated whether they had considered the attributes of the beers in the assortment along scales from 0 (not at all) to 10 (very much).

Next, participants reported their confidence (a) that the beer they had chosen would satisfy them, (b) that this beer was the best one, and (c) that they would actually like the beer they chose, along scales from 0 (not at all confident) to 10 (very confident) (α =.86). Also, they indicated their epistemic curiosity using a modified 9-item scale adopted from Leherissey (1971). Responses were made on a scale from 1 (not at all) to 4 (very much). Only four items showed reasonably high reliability (α = .72): "I thought it was fun to increase my understanding about beers," "I would enjoy reading more about the beers in this assortment," "I found myself getting tired of reading about the beers in this assortment (reversed)," and "I felt curious about the taste of each beer." These four items were averaged to provide a single measure of participants' overall epistemic curiosity (see Appendix D for the scales of epistemic curiosity).

Two questions were used as manipulation checks. Specifically, participants estimated the size of the assortment along a scale from 1 (extremely small) to 7 (extremely large) and indicated

their agreement that "some of the beers appeared to be more popular than others" along a scale from 0 (disagree) to 10 (agree). Finally, participants reported their experience and expertise with beer along a scale from 1 (not at all) to 7 (very much). Responses to the latter two items were used as an index of product knowledge (Pearson correlation, $r = .78$, $p = .0001$).

4.2.2 Results

The effects of experimental variables on dependent variables and manipulation check items were each analyzed using regression analyses, treating the perceived product knowledge (Z-transformed) as a continuous variable.

Manipulation checks. Choice set size was manipulated successfully. Participants reported that the size of the choice set was larger when they had seen the large menu than when they had seen the small one (5.74 vs. 3.17; $F(1, 84) = 84.26$, $p < .001$). No other effects were significant.

Participants' perception that some products were more popular than others depended on cueing, choice set size, and their perceived product knowledge. The three-way interaction of choice set size, cueing, and product knowledge was reliable, $\beta = 1.09$, SE = .30, $t = 3.60$, $p = .0005$. The results of spotlight analyses, shown in Table 2, indicate that when the assortment was large, knowledgeable participants were more likely to perceive the choice alternatives to differ in popularity when popularity cues were provided than when they were not (6.53 vs. 3.80, respectively; $t(85) = 2.13$, $p < .05$). However, this difference was not evident among unknowledgeable participants (4.55 vs. 5.66, respectively; $p > 10$). When the assortment was

small, popularity cues increased unknowledgeable participants' perceptions of the products' general popularity (from 2.72 to 5.15; t (85) = 2.21, $p < .05$), but decreased knowledgeable participants' perceptions (from 6.45 to 3.97; t (85) = 2.07, $p < .05$). The reason for this latter reversal is unclear.

Dependent variables. Similar regression analyses of effects of experimental variables on the main dependent variables revealed significant three-way interactions of cueing, choice set size and product knowledge in analyses of purchase intention (β = .41, SE = .15, t (85) = 2.68, p = .009), decision confidence (β = .58, SE = .25, t (85) = 2.34, p = .02), attribute deliberation (β = .75, SE = .26, t = 2.90, p = .005), and epistemic curiosity (β = .26, SE = .07, t = 3.73, p = .0003). These interactions were diagnosed using spotlight analyses (see Aiken, 1991; Preacher, Curran, & Bauer, 2006) of data from participants with high product knowledge (1 SD above the mean) and participants with low product knowledge (1 SD below the mean). Data pertaining to these analyses are summarized in Table 2 for each dependent variable.

These data suggest that when the assortment size was small, popularity cues decreased participants' purchase intention, decision confidence, deliberation of attributes and epistemic curiosity, and this was generally true regardless of their product knowledge. Moreover, this decrease was also generally apparent when the assortment was large and participants reported little knowledge about the product category. When the assortment was large and participants were knowledgeable, however, the presence of popularity cues increased purchase intention (5.62 vs 6.25), decision confidence (3.99 vs. 6.24, respectively; t=2.22, p = .03), attribute deliberation (7.33 vs. 8.64) and epistemic curiosity (2.74 vs. 3.25, respectively; directional t=1.80, p = 0.04).

Table 2

Purchase Intention, Decision Confidence, Attribute Deliberation and Epistemic Curiosity as a Function of Product Knowledge, Choice Set Size and Presence of Popularity Cues—Experiment 2

	High Knowledge (+1 SD)		Low Knowledge (-1 SD)	
Assortment Size	Small	Large	Small	Large
Purchase Intention				
Popularity cues	5.04	6.25	3.95	3.60a
No cues	5.95	5.62	4.01	5.36b
Decision Confidence				
Popularity cues	5.89	6.24b	3.55	3.49
No cues	7.08	3.99a	3.83	4.97
Attribute Deliberation				
Popularity cues	7.84	8.64	9.60c	6.37a
No cues	8.50	7.33	7.89ab	8.67b
Epistemic Curiosity				
Popularity cues	2.68a	3.25b	2.40	2.03
No cues	3.52b	2.74a	2.26	2.61

Cells in each sub-table with different subscripts differ directionally at $p < .05$.

Although these differences were not always significant (see Table 2), analyses of each assortment size condition separately indicated significant effects of product popularity on epistemic curiosity (F (3, 44) = 6.85, p <.001) in the small assortment size condition. When the

assortment was large, however, product knowledge had significant interactive effects on purchase intention (β = .60, SE = .22, t (45) = 2.81, p = .008), confidence (β = .93, SE = .40, t (41) = 2.34, p = .02), attribute deliberation (β = .90, SE = .39, t (45) = 2.26, p = .03) and epistemic curiosity (β = .27, SE = .10, t (45) = 2.78, p = .008).

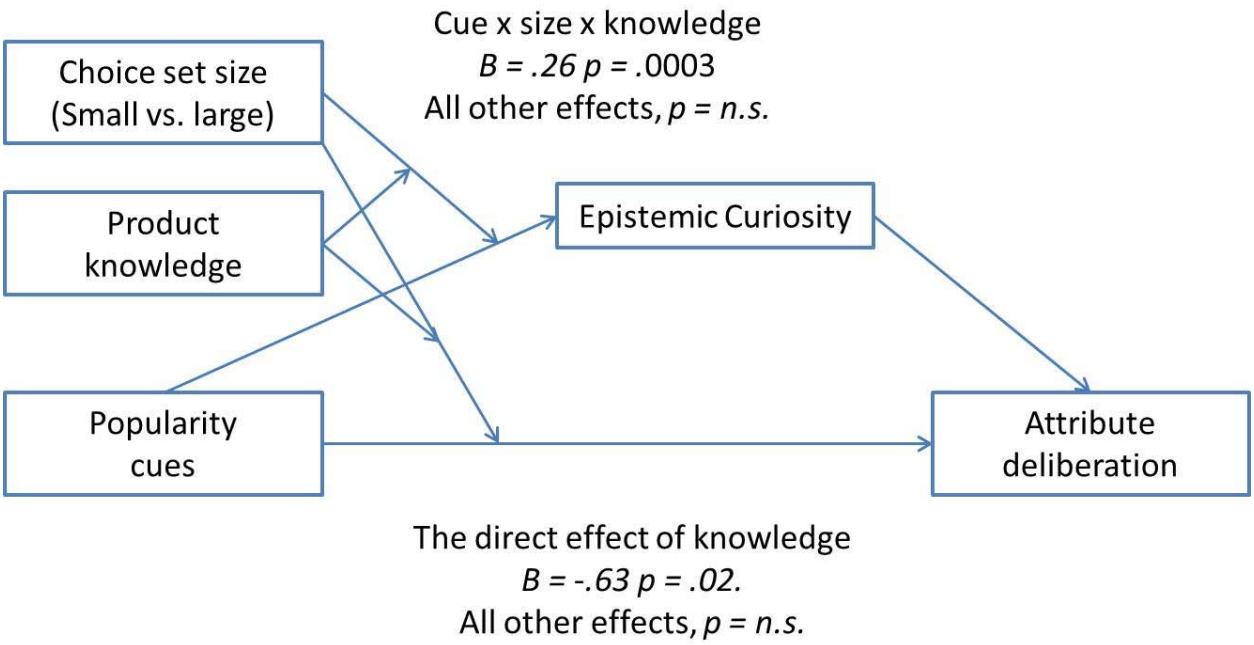
Moderated mediation analysis. I expected that epistemic curiosity would mediate the influence of product popularity on attribute deliberation and this effect would depend on participants' level of product knowledge. If the indirect effect of the highest order interaction (choice set size, product knowledge, and the presence of product popularity) is significant, I can draw the conclusion that the moderation is mediated.

I tested for this moderated mediation using bootstrapping analyses as in Experiment 4.1 (Hayes, 2012; Muller et al., 2005; Zhao et al., 2010). Hayes suggests that ''if the CI does not contain 0, [the] null hypothesis of no conditional indirect effect can be rejected." As expected, a bootstrap analysis confirmed an indirect effect of the three-way interaction on attribute deliberation through epistemic curiosity (for 1000 bootstrapping samples, 95% CI: .1466 to .8948, excluding 0).

Furthermore, the conditional direct effect of popularity cues on attribute deliberation was not significant at any value of the moderators (size and knowledge). Also, the conditional indirect effect of popularity cues on attribute deliberation is significant at all combinations of knowledge and assortment size (in high knowledge/small size conditions, 95% CI: -1.42 to -.25; in high knowledge/large size conditions, 95% CI: .0018 to 1.28; and in low knowledge/large size conditions 95% CI: -1.41 to -.25) except in low knowledge/small size conditions (95% CI: -0.40 to .75)). These results indicated that epistemic curiosity mediates the effect of product popularity on attribute deliberation when product knowledge is high.

In sum, the results of moderated mediation analysis support my expectation that the effect of popularity cues on knowledgeable participants' attention to product attribute information was mediated by its effects on epistemic curiosity.

Figure 2- Moderated mediation analysis in Experiment 4-2



4.2.3 Discussion

Experiment 2 confirmed the effect of product popularity on the tendency to deliberate on the attribute information. Furthermore, as I proposed, this depended on perceived product category knowledge. That is, when participants perceived their general product category knowledge to be relatively high and the choice set was large, providing an indication of others' opinions increased their curiosity about the reasons for these opinions and led them to think more extensively about the products' attribute descriptions. When participants perceived their knowledge to be low, or if the assortment size was small, this was not the case.

4.3 Experiment 3- The effect of product popularity on attribute deliberation

Experiment 3 provided more direct evidence of the increased effect of popularity information on knowledgeable consumers' use of product attribute information. In this study, I experimentally manipulated participants' perceptions of their knowledge about the product category (wine). Furthermore, I varied the valence of attribute descriptions. If product popularity motivates knowledgeable participants to resolve their knowledge gap by deliberating on product attributes, this should increase the impact of the attributes' favorableness on their judgments. In contrast, if unknowledgeable consumers are inclined to use popularity information as a heuristic basis for judgments, presenting this information should decrease the impact of attribute information on their product evaluations.

4.3.1 Methods

One hundred thirty-five members of an online panel were randomly assigned to conditions of a 2 (popularity cues: present vs. absent) × 2 (valence of attribute description: favorable vs. unfavorable) × 2 (product knowledge: low vs. high) design.

Construction of Stimuli. A focal product (wine) was chosen for the target product category. In addition, 11 filler products were selected of the sort one might serve at a party. For the target product, two attribute descriptions were constructed based on pretests. Each description contained descriptions of 7 to 8 attributes including aroma, color, and taste. The *favorable* description was consistently positive.

> Rich and full bodied, beautiful ruby red wine. Full flavors of roasted pear and nectarine are warmed with spice. The palate is intriguing aromas of spiced apple, warm citrus, and vanilla. Clean, delicate, lingering finish with perfectly balanced acidity. This vintage may be the best vintage they have produced since 1995. This wine is ready for drinking and promises you an extraordinary experience.

However, the unfavorable wine description mentioned slightly negative and neutral attributes.

> Full bodied red wine. Full flavors of roasted pear and nectarine are warmed with spice. The taste is scents of tobacco, dried herbs, and spices. Clean, delicate, long, complex finish with good acid integration. This wine is not produced in difficult years. This young wine is ready to drink but will acquire its best taste with few more years of aging.

The 11 filler items were food items that participants might find at a party such as "Spicy Artichoke Spinach Dip" and "Apple Anise Pizza." Descriptions of these items were generally positive and similar in length to the target descriptions.

Presentation of stimuli materials. The 12 products were shown on an appetizer menu for a party. The positive wine description was included in one set along with the11 filler items, and the negative wine description was in the other set.

In the *no-cue* condition, only the names and descriptions of the products were shown. In the *popularity-cued* condition, six out of 12 items (wine and five of the filler items) were popularity cued (with three icons highlighted) and the rest of were presented without any icons at all.

Product knowledge. Participants' perception of their product knowledge was manipulated using a procedure similar to that employed by Xu and Wyer (2010). At the beginning of the experiment, participants were given a knowledge assessment questionnaire containing a set of 15 binary choice (true or false) questions about wine (see Appendix E). In the *high perceived knowledge* condition, many of the questions were relatively easy, and participants were told that they had answered 12 of 15 questions correctly, regardless of their actual performance. In the *low perceived knowledge* condition many of the questions were actually difficult, and participants were told that they had answered three out of 15 questions correctly.

A separate pretest with an online panel was conducted to check the knowledge perception manipulation. After taking the wine knowledge assessment questionnaire and receiving feedback, participants answered a question to indicate their general wine knowledge. Also, they reported their perceived difficulty of the wine quiz on a scale from -5 (very easy) to 5 (very

difficult) with zero in the middle. Responses to the latter item were transferred to indicate that higher numbers mean greater difficulty (from 0 to 10). Participants reported their knowledge to be higher in high knowledge conditions than in low knowledge conditions (4.25 vs. 1.89, respectively; F (1, 52) = 14.64, $p < .01$), and perceived the wine quiz to be less difficult in the former condition than in the latter (4.47 vs. 6.35, respectively; F (1, 52) = 6.96, $p < .01$). Hence, I used the same manipulation in the main study.

*Procedure***.** Participants were invited to participate in a "product evaluation study." They were told they would be given a short warm-up quiz in order to make them comfortable with the task format and, on this pretense, completed the test of wine knowledge described earlier and received feedback on their performance. After receiving this feedback, they rated their general wine knowledge as a manipulation check along a scale from 0 (I don't know much about wine) to 10 (I have an understanding of wine).

Then, participants were directed to the main task with the information that researchers were interested in people's evaluation of various types of food items they might find at a party. They viewed a list of party food items with or without popularity cues. Next, they were asked to evaluate each product including wine and fillers along scales from -5 (very negative/very unfavorable/dislike) to 5 (very positive/very favorable/like). Responses along these scales for the wine ($\alpha = .94$) were averaged to provide a single index of product evaluation. Participants then indicated their level of product knowledge about the target product (wine) on a scale from 0 (not at all knowledgeable) to 10 (very knowledgeable). (Their response to this item was used as the second knowledge manipulation check.) Finally, they reported the extent to which the wine quiz and descriptions influenced their perception of their wine knowledge along a scale from 0 (not at all) to 10 (very much).

4.3.2 Results

Manipulation checks. Participants' perception of their wine knowledge was manipulated successfully. Immediately after receiving feedback about the wine knowledge quiz, participants indicated that they had a better understanding of wine in the high knowledge condition than in the low knowledge condition (4.31 vs. 2.44, respectively; F (1, 127) = 15.79, $p < .001$). This difference was also apparent when participants were later asked to indicate their level of wine knowledge (4.00 vs. 2.83, respectively; F (1, 127) = 5.48, $p < .05$). Despite these differences in perception, participants reported that the wine quiz did not influence their perception of their wine knowledge. (No effects of experimental variables on these judgments were significant, p > .10.)

The valence of the product descriptions was also manipulated successfully. Participants evaluated the wine more favorably when its description was favorable than when it was not (1.35 vs. 0.44, respectively; F (1, 127) = 4.36, $p < .05$).

Product evaluations. The evaluation of fillers ranged from .01 to 2.74 (M = 1.95, SD: 1.36 for all fillers). Participants' evaluations of the wine are summarized in Table 3 as a function of the valence of attribute description, product knowledge and cueing. Analyses of these data revealed a significant three-way interaction of these variables (F (1, 127) = 4.49, $p < .05$). Specifically, participants with high wine knowledge perception evaluated the positively valenced wine fairly favorably, regardless of the presence of popularity cues (1.84 vs. 1.76 when popularity cues were and were not provided, respectively). However, their evaluations of the

negatively valenced wines were significantly more negative when the target products were presented with popularity cues than when they were not (0.11 vs. 1.33, respectively). Hence, the difference between positive and negative evaluations was greater when popularity cues were provided than when they were not (1.73 vs. 0.43, respectively).

Table 3

Mean Ratings of Wine Evaluation
as a Function of Product Knowledge, the Valence of Attribute Descriptions, and Cueing—Experiment 3

Perceived knowledge		Positive Description (SD)	Negative Description (SD)	Difference
High	Popularity cues	1.84b (2.10)	.11a (2.73)	1.73*
	No cue	1.76b (3.08)	1.33ab (2.53)	.43
Low	Popularity cues	-.14a (2.68)	.30a (1.33)	-.43
	No cue	1.84b (2.69)	-.15a (2.61)	2.00*

Cells in each subtable with different subscripts differ at $p < .05$.

When participants perceived their knowledge to be low, however, the opposite was true. In the absence of popularity cues, attribute favorableness had an appreciable effect on their judgments (1.84 vs. -0.15, when attributes were favorable vs. unfavorable, respectively). When the same products were displayed with popularity cues, however, the effect of attribute

information was negligible (-0.14 vs. 0.30, respectively). The interaction of cueing and attribute favorableness was significant in an analysis of data from unknowledgeable participants alone; $F(1, 59) = 4.68$, $p < .05$.

4.3.3 Discussion

Experiment 4.3 showed that the effect of attribute information on knowledgeable participants' judgments was stronger when popularity cues were provided than when they were not. When consumers are knowledgeable about a product category, product popularity cues can direct their attention to attribute descriptions and consequently lead these descriptions to have a greater effect on judgments than they otherwise would.

I propose that this happens because indications of others' preference lead consumers to perceive a gap between what they know about the product category in general and what they know about the specific product being promoted. In three studies, I showed that this gap in their knowledge increases epistemic curiosity and consequently increases their attention to attribute information and the influence of this information on judgments. In addition, this tendency is greater when the set of choice alternatives is large than when it is small.

CHAPTER 5 CONCLUSION

This dissertation investigated the influence of product popularity cues on consumer decision making, especially when there is a gap between consumers' knowledge about a product category and a specific product assortment.

Previous research has focused on the effect of product popularity on consumers' decisions when their general product category knowledge is either useful or not useful in helping them evaluate unfamiliar options. What remains unclear in the existing literature is an understanding of how popularity cues influence consumer decisions when consumers' high general product category knowledge is not helpful in their product decision but has an influence on their decision process. My research eliminates this deficiency by showing that when consumers' product category knowledge is high but their product assortment knowledge is low, product popularity can make people be aware of what they do not know, and therefore make them think more carefully about the products' attributes to resolve their feeling of not-knowing.

Research reported in Chapter 4 indicates that when consumers are knowledgeable about a product category, product popularity cues can direct their attention to attribute descriptions and consequently lead these descriptions to have a greater effect on judgments and purchase intentions than they otherwise would. I have proposed that this happens because indications of others' preferences lead consumers to perceive a gap between what they know about the product category in general and what they do not know about the specific products that are available to purchase. This gap in their knowledge increases their epistemic curiosity and, consequently, increases their attention to attribute information and the influence of this information on

judgments. This tendency is greater when the set of choice alternatives is large than when it is small.

Three experiments confirmed these assumptions. In Experiment 1, where all participants were knowledgeable about the type of products they were evaluating, the presence of cues increased their attention to the available attribute information and this attention, in turn, mediated the effect of product popularity on purchase intention. Furthermore, Experiment 2 showed that when participants felt knowledgeable about the product category, they felt more curious about the product assortment when popularity cues were provided and the number of choice alternatives was large. As a result, they deliberated more on the product attribute information and felt more confident about their decisions. When participants were not knowledgeable, this was not the case.

Finally, Experiment 3 provided more direct evidence of the effect of popularity cues on attention to attribute information by manipulating the valence of product descriptions and participants' perceived product knowledge. This study showed that the effect of attribute information on knowledgeable participants' judgments was stronger when popularity cues were provided than when they were not. In contrast, the effect of attribute information on unknowledgeable participants' judgments decreased when these cues were presented.

It should be noted that although some participants in Experiment 1 deliberated on attribute information, they did not report increased decision difficulty over those in other conditions. One might wonder why decision difficulty did not vary across conditions even though previous research indicates a positive relationship between deliberative processing and decision difficulty. As people process more product attributes, they should experience greater

processing difficulty (e.g., Iyengar & Lepper 2000). As mentioned in the discussion of Experiment 1, however, there are a variety of moderators of the effect of assortment size on choice overload (Chernev et al., 2010; Scheibehenne et al., 2010) including individual factors and the complexity of the decision problem.

The most likely reason for this result is that when trying to resolve their curiosity, deliberating on product attributes may not be as burdensome. This speculation is consistent with research demonstrating that the perceived ease or difficulty of processing information is subjective. People can process the same information with different degrees of perceived difficulty (Schwarz, 1998; Schwarz, 2004; Winkielman, Schwarz, Reber, & Fazendeiro, 2003). In addition, when people are motivated to achieve their goal, they may expect that a means to fulfill the goal will require investing effort (Labroo & Kim, 2009). Research on epistemic curiosity also indicates that curiosity can make people do things that require more resources (Kang et al., 2009; Menon & Soman, 2002). In line with this research, I demonstrate that even if considering attribute information carefully may require more cognitive effort and, therefore, possibly increase the overall decision difficulty, pursuing an epistemic goal may make people engage in effortful processing.

Similar patterns of results have been observed in prior research. Fitzsimons and Lehmann (2004) showed that people may experience greater decision difficulty when an unattractive option is recommended over a clearly better option, generating psychological reactance. Also, Goodman et al. (2013) demonstrated that when consumers have existing preferences, they tend to experience greater decision difficulty because they tend to consider more options. Furthermore, when an assortment size is large and preference conflict is high, this tendency is stronger than otherwise. However, these explanations are not sufficient to explain my findings.

First, in my studies, all options are described favorably except the negative wine description in Experiment 3. However, this manipulation of the valence of product attributes was to see how the valence of attribute information is reflected in participants' product judgments rather than to create a situation in which a preference conflict exists. Furthermore, unlike the prior research that included one obviously better option than the rest of the options, a significant portion of the options were cued with product popularity (e.g., half the items in Experiment 1). Hence, participants hardly felt that their choices were restricted and were not annoyed by the recommended options.

Second, in my studies, participants' preferences are less likely to exist because the product assortments used in my studies consisted of unfamiliar options that are not easily available in typical grocery stores. Therefore, participants' knowledge about the product assortments in studies should be very low. Therefore, the earlier research cannot explain the findings that when there is no obviously better or preferred options, product popularity can increase attribute deliberation.

Some may question whether these consumers with less developed preferences in the unfamiliar assortment must deliberate on attribute information in order to construct their preferences and make a choice (Chernev, 2003; Coupey, Irwin, & Payne, 1998). However, this should be true for making decisions with and without popularity cues and regardless of the demands of the choice task. As such, the deliberation due to preference construction cannot explain why knowledgeable consumers deliberate on attribute information only in a large and popularity cued condition.

The current research is the first to identify the circumstances under which product popularity can increase decision makers' attention to product attributes. Although product popularity has been considered to mainly have a conformity effect on consumer decisions and to tend to decrease their attention to product attributes, my research shows that it is influenced by a gap in consumer knowledge and perceived choice demands.

In addition to furthering the field's understanding of the effect of product popularity, this work extends prior research on consumer knowledge and provides a framework that clarifies when knowledgeable consumers consider consensus information advantageous rather than ignoring or becoming annoyed by it.

I note, however, a few limitations of the effect. An important boundary for the finding is that there are some product domains in which consumers' knowledge is generally high. For example, breakfast cereal is a familiar product to average U.S. Americans. Hence, the difference in the level of knowledge may not be as clear as that for other products such as gourmet beer or wine. In the case of familiar products, the influence of product knowledge on the effect of popularity may not be as strong as what this research discovered.

In addition, the finding that product popularity makes consumers deliberate more on attribute information is based on the assumption that a discrepancy exists, a gap between their low product assortment knowledge and their high product category knowledge. In some cases, however, it is possible that consumers with limited product category knowledge may feel confident with a specific product assortment. In this case, in spite of the gap between these two types of knowledge, they might not be able or motivated to deliberate on product attributes. Or, due to their strong preexisting preference within the particular assortment, they may experience

preference conflict as knowledgeable consumers often do. Further research could examine how the effects shown here would vary with the other types of gaps in consumer knowledge.

Product popularity could potentially have other effects than those I considered in my dissertation. This dissertation has been restricted to a situation in which consumers evaluate a set of products in a particular category (an assortment of cheesecakes, beer, or wine). However, consumers often evaluate products from multiple categories with or without popularity information. For example, when consumers explore a vacation plan in Orlando, they may have access to a great deal of popularity information about hotels, but limited popularity information about rental cars. My research indicates that if consumers feel curious about the available hotels due to the popularity information, they are likely to deliberate on the information about hotels. It is unclear whether their deliberative processing mode persists when evaluating the second, unrelated product, rental cars.

I speculate that if indications of others' preferences in a given category motivate knowledgeable consumers to fill a gap in their general category knowledge by contemplating the implications of attribute information, this disposition could induce a behavioral mindset that generalizes to other situations (Wyer & Xu, 2010). As a result, this mindset may lead consumers to focus more attention on attribute information in the other situations as well. Thus, for example, calling consumers' attention to their lack of knowledge about wine might influence their consideration of specific product attributes when choosing wine but also when choosing coffee. In a related vein, Moreau, Lehmann, and Markman (2001) suggest that consumers use their existing knowledge in one domain to make inferences about new domains. The conditions in which the product popularity has a motivational influence on processing in unrelated situations are clearly worth investigating.

Finally, this dissertation provides marketers with a better understanding of the conditions wherein product popularity information may increase attribute deliberation. More specifically, the dissertation sheds light on how knowledgeable consumers use product popularity information to make a decision from among unfamiliar options. When marketers present product popularity, they would be advised to make detailed attribute information available, especially when they are offering unique items and expect to have consumers with generally high product category knowledge. For instance, boutique or specialty stores usually deal with unique options. In this case, sufficient product attribute information about products should be available along with popularity information because consumers who feel confident about their product category knowledge but not about the unique items would like to consider detailed information rather than simply picking popular options.

In addition, retailers that deal with exclusive products for a familiar product category would be advised to add product popularity information along with the description to introduce the unfamiliar product to their consumers. Taken from a previous example, Trader Joe's sells many unconventional items including Blueberry Muesli cereal which is less known by the general public. Hence, it is possible that many of its patrons perceive themselves to be knowledgeable about cereal products but not the stores' unique assortment including new types of cereal. To help its consumers' understanding, the store tries to provide a lot of product information through different routes from store displays to its website to a mobile application. My research suggests that adding popularity information would be useful to make consumers curious about the taste of the cereal, possibly resulting in higher purchase intention.

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APPENDICES

APPENDIX A: MATERIALS USED IN EXPERIMENT 1

Small assortment without cues

N' Orleans Praline Cheesecake

layered with a sumptuous bed of pecans and soft caramel. Daddy then tops it with a smooth caramel topping sprinkled with pecans.

Funky Monkey Cheesecake

Chocolate cookie crust filled with a smooth banana batter and swirled with handmade chocolate glaze and caramel. Topped with roasted peanuts.

Blond Grand Marnier Cheesecake

Topped with orange flavored white chocolate on Graham cracker crust. Grand Marnier is added to our "original" batter.

Triple Bliss Cheesecake

A layer of dark chocolate, milk chocolate and white chocolate for a great look and taste on Chocolate cookie crust. Topped with both white and dark chocolate glaze.

Turtle Trio

Creamy caramel cheesecake bursting with chocolate, caramel and pecans and topped with a thick layer of chocolate mousse, more caramel and more pecans.

Downtown Cheesecake

Creamy smooth cheesecake chicly dressed in meltingly delicious dark chocolate ganache streaked with white chocolate

Small assortment with popularity cues

N' Orleans Praline Cheesecake

layered with a sumptuous bed of pecans and soft caramel. Daddy then tops it with a smooth caramel topping sprinkled with pecans.

Funky Monkey Cheesecake

Chocolate cookie crust filled with a smooth banana batter and swirled with handmade chocolate glaze and caramel. Topped with roasted peanuts.

Blond Grand Marnier Cheesecake

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Turtle Trio

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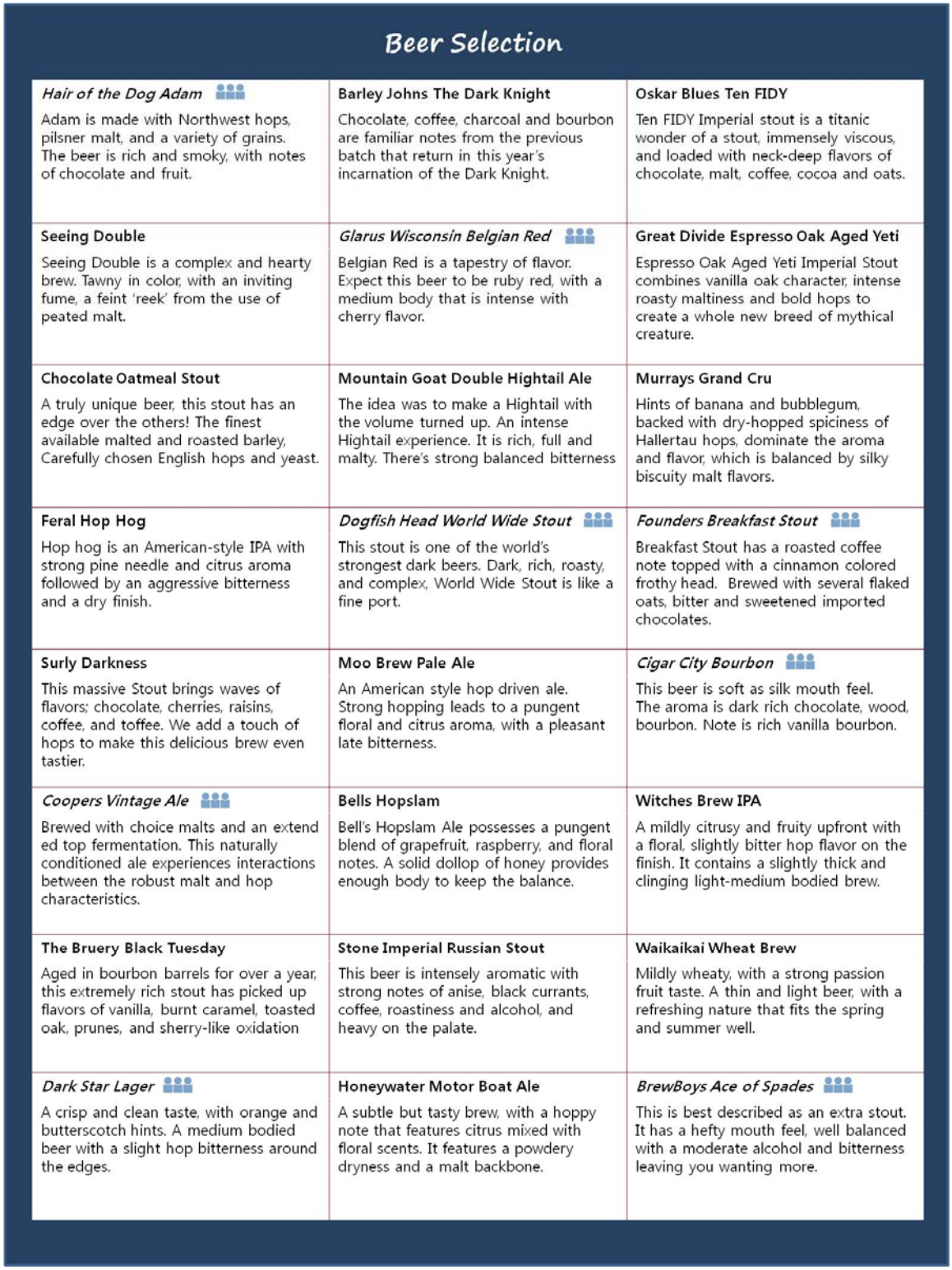
Downtown Cheesecake

Creamy smooth cheesecake chicly dressed in meltingly delicious dark chocolate ganache streaked with white chocolate

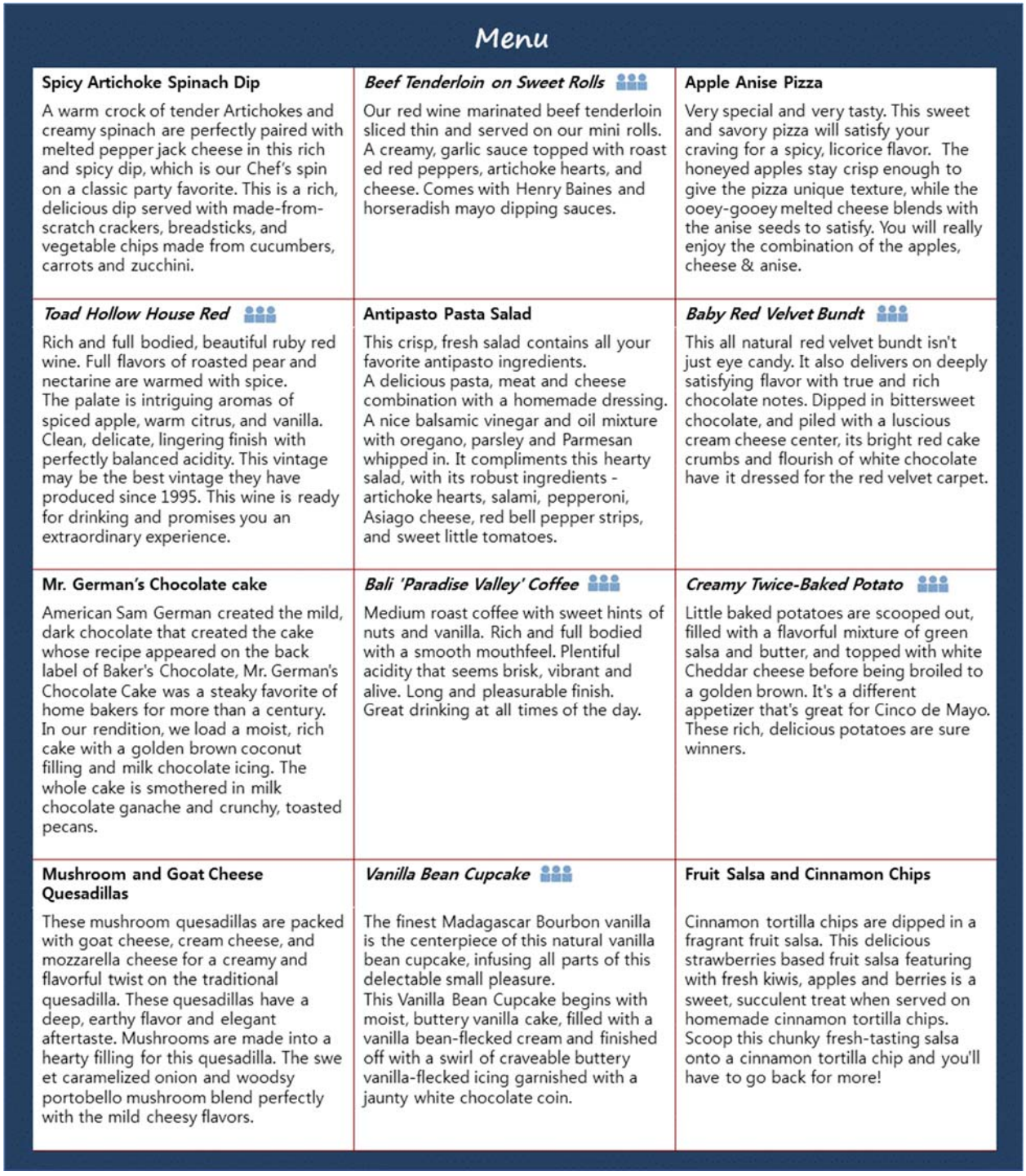
APPENDIX B: MATERIALS USED IN EXPERIMENT 2

Large assortment with popularity cues



APPENDIX C: MATERIALS USED IN EXPERIMENT 3

An ssortment with popularity cues



Menu

Spicy Artichoke Spinach Dip

A warm crock of tender Artichokes and creamy spinach are perfectly paired with melted pepper jack cheese in this rich and spicy dip, which is our Chef's spin on a classic party favorite. This is a rich, delicious dip served with made-from-scratch crackers, breadsticks, and vegetable chips made from cucumbers, carrots and zucchini.

Beef Tenderloin on Sweet Rolls

Our red wine marinated beef tenderloin sliced thin and served on our mini rolls. A creamy, garlic sauce topped with roast ed red peppers, artichoke hearts, and cheese. Comes with Henry Baines and horseradish mayo dipping sauces.

Apple Anise Pizza

Very special and very tasty. This sweet and savory pizza will satisfy your craving for a spicy, licorice flavor. The honeyed apples stay crisp enough to give the pizza unique texture, while the ooey-gooey melted cheese blends with the anise seeds to satisfy. You will really enjoy the combination of the apples, cheese & anise.

Toad Hollow House Red

Rich and full bodied, beautiful ruby red wine. Full flavors of roasted pear and nectarine are warmed with spice. The palate is intriguing aromas of spiced apple, warm citrus, and vanilla. Clean, delicate, lingering finish with perfectly balanced acidity. This vintage may be the best vintage they have produced since 1995. This wine is ready for drinking and promises you an extraordinary experience.

Antipasto Pasta Salad

This crisp, fresh salad contains all your favorite antipasto ingredients. A delicious pasta, meat and cheese combination with a homemade dressing. A nice balsamic vinegar and oil mixture with oregano, parsley and Parmesan whipped in. It compliments this hearty salad, with its robust ingredients - artichoke hearts, salami, pepperoni, Asiago cheese, red bell pepper strips, and sweet little tomatoes.

Baby Red Velvet Bundt

This all natural red velvet bundt isn't just eye candy. It also delivers on deeply satisfying flavor with true and rich chocolate notes. Dipped in bittersweet chocolate, and piled with a luscious cream cheese center, its bright red cake crumbs and flourish of white chocolate have it dressed for the red velvet carpet.

Mr. German's Chocolate cake

American Sam German created the mild, dark chocolate that created the cake whose recipe appeared on the back label of Baker's Chocolate, Mr. German's Chocolate Cake was a steaky favorite of home bakers for more than a century. In our rendition, we load a moist, rich cake with a golden brown coconut filling and milk chocolate icing. The whole cake is smothered in milk chocolate ganache and crunchy, toasted pecans.

Bali 'Paradise Valley' Coffee

Medium roast coffee with sweet hints of nuts and vanilla. Rich and full bodied with a smooth mouthfeel. Plentiful acidity that seems brisk, vibrant and alive. Long and pleasurable finish. Great drinking at all times of the day.

Creamy Twice-Baked Potato

Little baked potatoes are scooped out, filled with a flavorful mixture of green salsa and butter, and topped with white Cheddar cheese before being broiled to a golden brown. It's a different appetizer that's great for Cinco de Mayo. These rich, delicious potatoes are sure winners.

Mushroom and Goat Cheese Quesadillas

These mushroom quesadillas are packed with goat cheese, cream cheese, and mozzarella cheese for a creamy and flavorful twist on the traditional quesadilla. These quesadillas have a deep, earthy flavor and elegant aftertaste. Mushrooms are made into a hearty filling for this quesadilla. The swe et caramelized onion and woodsy portobello mushroom blend perfectly with the mild cheesy flavors.

Vanilla Bean Cupcake

The finest Madagascar Bourbon vanilla is the centerpiece of this natural vanilla bean cupcake, infusing all parts of this delectable small pleasure. This Vanilla Bean Cupcake begins with moist, buttery vanilla cake, filled with a vanilla bean-flecked cream and finished off with a swirl of craveable buttery vanilla-flecked icing garnished with a jaunty white chocolate coin.

Fruit Salsa and Cinnamon Chips

Cinnamon tortilla chips are dipped in a fragrant fruit salsa. This delicious strawberries based fruit salsa featuring with fresh kiwis, apples and berries is a sweet, succulent treat when served on homemade cinnamon tortilla chips. Scoop this chunky fresh-tasting salsa onto a cinnamon tortilla chip and you'll have to go back for more!

APPENDIX D: THE SCALES OF EPISTEMIC CURIOSITY USED IN EXPERIMENT 2

Please read each statement and then click to indicate how you think you would felt while you evaluating the wine assortment.

There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to best describe how you felt.

1 (not at all) to 4 (very much)

1. I thought it was fun to increase my understanding about beers
2. I would enjoy reading more about the beers in this assortment.
3. I would like to see more details about the beers descriptions in this assortment.
4. It was fascinating to me to read the beer descriptions.
5. When I read a description that puzzled me, I kept reading it until I understood it.
6. I found myself getting tired of reading about the beers in this assortment (reversed).
7. When I came across a beer description I did not understand, I tried to figure out its meaning.
8. This display of beers stimulated me to think of the beers in the list.
9. I felt curious about the taste of each beer.

APPENDIX E: KNOWLEDGE PERCEPTION MANIPULATION USED IN EXPERIMENT 3

Wine knowledge manipulation questions.

High knowledge condition

1. To taste wine better, a person should leave the first taste of wine in his/her mouth for 3 to 5 seconds.
2. The color of médoc wines is red.
3. You should probably refrain from tasting wine if you have a stuffy nose.
4. A spoiled bottle of wine means moldy or vinegar smell.
5. White wines should be served cold and red wines should be served at room temperature or slightly cold.

Low knowledge condition

1. Appellation means a wine-producing region defined by certain geographical features.
2. A Shiraz is a much more full-bodied red wine than the fruity Syrah.
3. When you see the term "Meritage" on a wine label, the wine is French and has received high honors.
4. In Champagne-speak, a cuvee is the finished blend of a Champagne.
5. Whether it is young or old is can be learned from the color of a wine.

APPENDIX F: SUMMARY OF RELEVANT RESEARCH ON EFFECTS OF PRODUCT POPULARITY

Author(s)	Year	Context	The existence of preexisting preference or dominating option(s)	Dependent Variable	Findings
Cai et al.	2009	a choice of food items at a restaurant	possible but controlled or measured	the number dishes sold	table cards naming the five most popular items in a restaurant boosted the frequency of orders of these items by as much as 20%
Carare	2012	a choice of mobile applications	no	willingness to pay	willingness to pay about $4.50 more for top-ranked mobile applications than for the same applications presented without ranking information
Hung and Chen	2006	a choice of book	yes a dominating option	the number of people who chose either A or B	a greater sales volume leads to a higher preference for the option when other related information does not discriminate among the alternatives
Salganik, Dodds, and Watts. & Salganik and Watts	2006 & 2008	a choice of a song	no	the number of downloads of a song	The number of download leads to an increased number of downloads of an initially less preferred product

Author(s)	Year	Context	The existence of preexisting preference or dominating option(s)	Main dependent variable	Findings
Hanson and Putler	1996	a choice of computer program	no	the number of downloads of a file	manipulating perceptions of the number of other users who had previously downloaded a file increased future sales levels
Goldstein et al.	2008	choice to participate in a towel reuse program at a hotel	no	the number of people who decided to reuse towels in a hotel	the towel reuse rate was greater in the social message than in the standard environmental message condition (44% vs. 35%, respectively)
Goodman et al.	2013	choice of product (e.g., tea, energy bar, etc.)	yes	decision difficulty and the consideration set size	product recommendations can make choices more difficult than without this information because of possible preference conflict
Fitzsimons and Lehmann (2004		choice of energy bar	yes	the number of particular options chosen	participants' choices were typically opposed to the recommendation because of greater decision difficulty, lower decision satisfaction, and greater psychological reactance
Yaniv	2004	Participants' memory about historical events	not applicable	answers to the questions about historical events	knowledgeable participants gave greater weight to their own opinions and discounted others' opinions in a memory task; as a result, their judgments benefitted less from these opinions than less knowledgeable participants' did

Author(s)	Year	Context	The existence of preexisting preference or dominating option(s)	Dependent Variable	Findings
Baron, Vandello, and Brunsman	1996	participants along with confederates viewed a series of pictures for either 1 or 10 seconds, and then responded to questions about them	not applicable	answers to the question about study materials	participants based their responses on confederates' (incorrect) answers only when (a) the pictures were presented for a short time and (b) they believed that their responses were important rather than part of a pilot test
Gino and Moore	2007	estimation of the weight of the person in a picture	not applicable	how much participants weighed the advice they received	participants tend to overweight advice if a task is difficult and underweight it if a task is easy
Mackie	1987	opinion about involvement of the US military in another part of the country	not applicable	attitude change toward majority position	people are more likely to adopt the majority's opinion on an issue when they lack the necessary ability or motivation to process issue-relevant material
Sasaki et al.	2011	choice of digital cameras, headphones, music CDs, books and detergents	no	product choice	people's choice of the most popular option is greater when the amount of attribute information provided is large, thereby exceeding their capacity to process it